

95th Congress }  
2d Session }

COMMITTEE PRINT

A LEGISLATIVE HISTORY OF THE CLEAN  
AIR ACT AMENDMENTS OF 1977

A CONTINUATION OF THE CLEAN AIR ACT  
AMENDMENTS OF 1970

TOGETHER WITH

A SECTION-BY-SECTION INDEX

PREPARED BY THE

ENVIRONMENTAL POLICY DIVISION

OF THE

CONGRESSIONAL RESEARCH SERVICE

OF THE

LIBRARY OF CONGRESS

FOR THE

COMMITTEE ON ENVIRONMENT AND  
PUBLIC WORKS

U.S. SENATE



VOLUME 8



AUGUST 1978

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Printed for the use of the Committee on Environment and Public Works

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U.S. GOVERNMENT PRINTING OFFICE

37-497 O

WASHINGTON : 1980

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## CHAPTER 12

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SIDE-BY-SIDE COMPARISON OF PROVISIONS OF  
H.R. 10498 and S. 3219

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SIDE-BY-SIDE COMPARISON OF PROVISIONS OF  
HR. 10498 AND S. 3219, PROPOSED  
CLEAN AIR ACT AMENDMENTS OF 1976

by

Maria H. Grimes  
Analyst  
Environment and Natural Resources Policy Division

July 21, 1976

## NOTE

In this summary presentation, sections of the Senate bill, S. 3219, are compared to corresponding sections of the House bill, HR. 10498. Thus, sections of HIR 10498 appear on the left side of each page in numerical order, while corresponding sections of S. 3219 appear on the right at appropriate locations. Naturally, there are sections in each bill which have no corresponding part in the other and thus appear alone.

In developing this comparison, edited versions of summaries in House and Senate Reports on the Clean Air Act Amendments of 1976 (Numbers 94-1175 and 94-717, respectively) were used.

SECTION 1--SHORT TITLE

SECTION 2--AUTHORIZATIONS

FY 1977--\$200 million; FY 1978--\$200 million; FY 1979--\$200 million. Does not include research activities

TITLE I

SECTION 101--UNREGULATED POLLUTANTS

Requires EPA to promulgate regulations to control vinyl chloride, cadmium, arsenic, and polycyclic organic matter (POMa), but-eno unregulated, unless EPA finds within one year that these pollutants are not hazardous to public health. EPA is to study these pollutants plus sulfates. Requires EPA to promulgate a one-hour national primary ambient air quality standard for NO<sub>2</sub> unless it finds that present annual average NO<sub>2</sub> standard is adequate to protect public health.

SECTION 102--BASIS FOR ADMINISTRATIVE STANDARDS

Establishes standard of proof which EPA must meet before promulgating regulations controlling the emission of any air pollutant from any class of sources under this Act. Regulation is authorized only if emissions of the pollutants from that class of sources contribute to air pollution which "may reasonably be anticipated to endanger public health or welfare."

SECTION 38--AUTHORIZATIONS

Other than for sections 103(f)(3) and (d), 104, 110(b)(8), 150-159, 212, 315, and 403, \$300,000,000 for FY 1976, \$75,000,000 for the transition period, and \$200,000,000 for FY 1977 and FY 1978. The new transportation control planning section has a \$75,000,000 authorization to be available until expended.



# SECTION 9(a)-- DELAYED COMPLIANCE ORDERS

Authorizes a State, and after 30 days notice, EPA, to issue enforcement orders to sources not in compliance with applicable emission limitations. Such orders shall require compliance as expeditiously as practicable, but no later than January 1, 1979.

If a non-complying source intends to comply by closing or replacing a facility, or changing its production process, the State or EPA may issue an order permitting it to operate until January 1, 1979 upon the posting of a bond or other surety. If the source fails to close or replace the specified facility, or fails to change its production process, the bond shall be forfeited.

If a source intends to comply with an innovative control technique which will reduce emissions more than the applicable standard, or which has potential industry-wide application at significantly lower costs than demonstrated control technology, such facility must be in compliance by January 1, 1981.

Any enforcement order in effect on the date of enactment of the amendments shall remain in effect to the extent that it is consistent with section 113(d) but shall adhere to the compliance date of January 1, 1979.

## SECTION 10--PENALTIES

1. Provides for a civil penalty of not more than \$10,000 per day of violation, in addition to injunctive relief, for violations of enforcement orders or various requirements of the Act. The current criminal penalty provision is revised to include violations of sections 113(d) enforcement orders involving compliance date extensions, and to add to the definition of "person" for the purpose of criminal sanctions, any responsible corporate officer.

2. Provides a fine of not more than \$25,000 per day for knowing violations of implementation plan requirements where there has been

# SECTION 103--COMPLIANCE DATE EXTENSIONS (STATIONARY SOURCES)

Authorizes the States and EPA to grant extensions of compliance deadlines for stationary sources under the State Implementation plans, for up to five years, after notice and a formal hearing on the record.

An extension may be granted on 8 grounds: (1) the lack of adequately demonstrated technology to meet necessary emission limitations; (2) a shortage of clean fuels or technology (which has been adequately demonstrated); (3) unavailability of means of compliance due to an emergency situation; (4) delay of construction of a replacement facility; (5) temporary unavailability of financing for procurement of clean fuels or technology; (6) to encourage use of innovative emission control technology.

Provides that any existing primary non-ferrous metal smelter could be granted up to two compliance date extensions not to exceed five years each in length to permit it to use emissions systems other than those ordinarily required. EPA could only terminate the extension if it is found after a full adjudicatory hearing, that means of compliance have become reasonably available. As conditions to the granting of an extension, the smelter must, among other things, agree to comply with requirements needed to maximize reliability and enforceability of the ambient air quality standard within a designated area of any national ambient air quality standard within a designated area would be considered to be a violation of the State Implementation plan.

Sources receiving extensions must meet compliance schedules and use the best interim control measures during the extension period.

## SECTION 104--ASSESSMENT OF CIVIL PENALTIES

Authorizes civil penalties of up to \$25,000 per day for violations of the Clean Air Act. The courts are directed to take into account the size of the business, and the seriousness of the violation, in setting the amount of the penalty.

no request for a section 113(d) enforcement order extending the compliance date, filed within 180 days after enactment, and for violations of the provisions of section 120 which require submission of information by January 1, 1977, on the cost of compliance and which require the payment of the delayed compliance penalty.

3. Authorizes the EPA, at the request of a Governor who alleges that a major emitting facility in another State will interfere with the achievement or maintenance in the Governor's own State of any primary or secondary ambient air quality standard, to take such measures, including seeking injunctive relief, as necessary to prevent such interference.

#### SECTION 105--EXCESS EMISSION FEES

If a major stationary source applies for and receives a compliance date extension (see section 103) and the reasons for its inability to comply with applicable emission limitations were not primarily beyond its control, then it must pay an excess emission fee.

The amount of the fee, not to exceed \$5,000 per day, is to be based on a schedule of rates promulgated by EPA. This schedule must be designed (1) to prevent any extension from creating a competitive disadvantage for sources receiving it (over those sources which comply on time) and, (2) to encourage compliance as rapidly as practicable.

EPA is authorized to reduce or mitigate the fee under certain specified conditions. The fee may only be applied to major stationary sources, i.e., those which emit over 100 tons of pollutant/year.

Judicial review of action of the EPA under this section is expressly authorized.

#### SECTION 9(b)--DELAYED COMPLIANCE PENALTY

(New section 120.) Any source which receives an enforcement order but does not comply by January 1, 1979, shall be automatically subject to a delayed compliance penalty in the form of monthly payments equal to all costs of compliance and the additional economic value gained by delay.

Any source which receives an enforcement order with a compliance date later than January 1, 1978, shall furnish to the State prior to January 1, 1977, detailed information on its proposed method of compliance, including all costs. After publication by the State of a proposed delayed compliance penalty and an opportunity for a public hearing, the State shall amend such source's enforcement order to include such penalty, to accrue after January 1, 1979.

If EPA objects to such penalty it shall give written notice of his objection within 90 days after the proposal, and substitute its own penalty.

A source which fails to make a penalty payment shall be subject to a penalty of not more than \$25,000 per day of violation, as provided in section 113(e). Judicial review of a penalty is available in district court, but such review shall in no case delay the imposition of a delayed compliance penalty unless bond is posted. Financial relief shall be provided to a source which successfully challenges its established penalty after partial payment.

#### SECTION 40--NOx EMISSIONS PENALTY STUDY

EPA shall submit to the Congress within 1 year a report on the possible creation of a system of penalties on NO<sub>x</sub> emissions from new and/or existing major emitting facilities, to encourage the development of more effective control technologies. Such proposed system would terminate when adequate control technology is available to be installed on such sources.

## HR 10498

## SECTION 15--COAL CONVERSION AMENDMENTS

Includes two amendments dealing with coal conversion: a provision within the new section 113(d) compliance date extension procedure for sources converting to coal. 2. A repeal of section 119 of the Clean Air Act originally added by the Energy Supply and Environmental Coordination Act of 1974, namely, that the State of Tennessee and notification required to establish the date of effectiveness of FEA prohibition orders shall be provided by the appropriate States rather than by EPA. These provisions replace the current means of providing compliance date extensions for sources ordered to convert to coal by FEA with the compliance date extension procedure established for all stationary sources under these new amendments, and preserves the approach of section 119(d)(5) by adding similar language to section 111 of the Act.

Any source ordered to convert under section 2 of ESECA or which converts to coal as a primary energy source because of actual curtailment of natural gas supplies under a curtailment plan provided by FPC or, for intrastate gas supplies, by a State regulatory commission, can receive an extension for compliance with applicable emission limitations until January 1, 1979 or 3 years after the date on which the conversion order is issued. The compliance date may not be extended beyond July 1, 1980.

Coal conversion having become a long-term program with full State involvement, this section repeals section 119 and provides that certifications and notifications to the FEA shall be provided by the appropriate States rather than by EPA.

The section further provides that references to section 119 in section 2 of ESECA shall be construed to refer to section 113(d) of the Clean Air Act (on delayed compliance orders) and to paragraph (5) thereof in particular.

## TITLE III, SECTION 33--EMISSION LIMITATION

Amends section 302 of existing law. "Emission limitation" is defined as permanent controls which result in continuous limit of emissions from a source, including a detailed schedule and timetable of compliance. Note:

## SECTION 5--IMPLEMENTATION PROVISIONS

A State Implementation Plan may include enforceable supplemental emission reduction strategies for existing non-ferrous smelters.

## SECTION 106--COAL CONVERSION

Deals with: (1) compliance date extensions for sources prohibited from burning oil or natural gas, or both; and (2) whether to require continuous or intermittent control of pollutants from stationary sources.

COAL CONVERSION--This section amends section 119 of the Clean Air Act, as adopted by the Energy Supply and Environmental Coordination Act of 1974 (P.L. 93-319). It permits compliance date extensions for sources converting to coal to last until 1980, instead of 1979, as under existing law. A further extension up to as late as 1985 could be granted under section 103 of the bill.

The amendments also permit extensions for those coal burning sources (subject to an EPA order not to switch to oil or natural gas), which had intended to meet applicable emission limits by switching to one of these fuels and had received a variance or plan revision to do so. Extensions are not now authorized for these sources.

"Regional limitations" that prohibit deadline extensions for any pollutant if the air quality in a region exceeds primary standards for that pollutant are rebuttable upon the finding that emissions from a source will not significantly affect air quality in that region.

Concurrence by the Governor as a condition for granting this type of extension is required.

CONTINUOUS CONTROLS--The amendments affirm that the Act requires continuous emission reduction measures to be applied. Interim control measures or other pollution dispersion techniques would not be permitted as final compliance strategies.

## SECTION 107--STRATOSPHERE AND OZONE PROTECTION

Provides for a two-year study on the cumulative effects of various substances and activities on the stratospheric ozone layer, to be conducted by the EPA in cooperation with the National Academy of Sciences, and an interagency task force.

At the end of the two-year study (or earlier under specified circumstances), EPA may promulgate regulations to protect the stratospheric ozone layer, but only if EPA finds that the ozone layer (and public health or welfare) may reasonably be anticipated to be endangered. Feasibility and costs of controlling any dangerous substance or activity must be considered.

Regulations must be submitted to Congress and may not take effect for 60 legislative days after submission. If either House passes a disapproval resolution within that 60 day period, the portion of the regulations thus disapproved may not become effective. Expedited consideration by Congress is provided for.

Federal regulations, once in effect, preempt State or local regulations, but a State's right to adopt and enforce more stringent aerosol spray emissions regulations is preserved.

## SECTION 108--PREVENTION OF SIGNIFICANT DETERIORATION

(1) Affirms the decision that the Act requires a policy of prevention of significant deterioration; (2) provides additional Congressional guidance to apply what "significant deterioration" is and how it is prevented; (3) deletes current EPA regulations and substitutes a system which places the State role to the States and local governments and which restricts the Federal Government in the following ways: the bill (a) removes the Federal land manager's authority to control classification of Federal lands, which is contained in the EPA regulations; (b) eliminates the administrator's authority under current EPA regulations to override a State's classification of any area on the ground that the State improperly weighed energy, environment and other factors; (c) prohibits EPA from compelling any State to impose any uniform or automatic no growth buffer zone around any area; (d) provides a local role in decisionmaking; and (e) fixes allowable increments and removes EPA's authority to prescribe more or less strict requirements.

## SECTION 10--STRATOSPHERIC OZONE PROTECTION

Adds a new part B to title I, containing new sections 151 through 159. Requires studies by the National Academy of Sciences and the appropriate research agencies on the effects of human activities on the ozone layer and the effects of depletion of that layer on human health and welfare.

If EPA finds that halocarbon emissions from aerosol containers may endanger human health or welfare then it will, by January 1, 1978, propose regulations to restrict their manufacture and use. Similarly, EPA will, by April 1, 1978, propose regulations to control halocarbon emissions from other sources if needed to protect the public health or welfare.

Congressional review and expedited regulation, if needed, to protect the public from significant risk due to halocarbon emissions from aerosol containers are provided for.

## SECTION 6--REQUIREMENT TO PREVENT SIGNIFICANT DETERIORATION

New subsection 110(g) completely defines the requirements of the Clean Air Act to prevent significant deterioration. It protects clean air areas from deteriorating while permitting economic development. This provision: (1) places primary responsibilities and authority with the States, backed by the Federal Government; (2) applies only to new major emitting facilities, not affecting existing facilities; (3) requires that large new sources use the best available technology to minimize emissions, determined by each State on a case-by-case basis; (4) provides a margin of safety to protect national ambient air quality standards, assuring prudent consideration of any major emitting facility that may threaten that air quality; (5) requires the Federal Government, as a property owner, to protect the values related to air quality on certain Federal lands under the stewardship of various Federal agencies; (6) eliminates "buffer zones" that were hypothesized around various land classifications; and (7) affects only those areas where air quality is cleaner than the present primary or secondary standards.



## SECTION 2--AREA IDENTIFICATION

Amends section 107. Each State must submit to EPA within 120 days after enactment, a list identifying air quality levels of its air quality control regions or portions thereof. EPA shall promulgate such list within sixty days with any necessary modifications, and after notifying and receiving any comment from the State.

## SECTION 6--REQUIREMENT TO PREVENT SIGNIFICANT DETERIORATION (Cont'd)

Each State which contains an area in which the levels of sulfur oxides or particulates are better than any secondary air quality standards (or primary standard, if that standard is more stringent) for that pollutant must adopt and enforce as part of its implementation plan provisions to prevent significant deterioration of air quality.

Such protection is defined by (a) maximum numerical pollution increments for sulfur dioxide and particulates, which can be added to existing levels of those two pollutants in designated areas, and (b) in specified Federal land areas (Class I areas), such as national parks and wilderness areas; these areas are also subjected to a review process based on the effect of pollution on the area's air quality related values.

EPA is required to study the establishment of such increments for other pollutants and to recommend within 1 year increments for stationary source emissions of nitrogen oxides and hydrocarbons.

All international parks regardless of size and each national park, wilderness area, and memorial park exceeding 5,000 acres which exist on the date of enactment are designated as Class I areas. Those national parks and wilderness areas established after enactment shall be initially designated Class I but may be redesignated Class II with the concurrence of the State and the Federal Land Manager. All other lands, including other Federal lands, shall be designated Class II areas, but may be redesignated Class I by the State. The concurrence of the Federal Land Manager is required where Federal lands are involved.

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AREA CLASSIFIED PLANS--Each State must classify those areas which are cleaner than the national ambient air quality standards as Class I, Class II, or Class III for all pollutants for which national ambient air quality standards are established. For any pollutant other than sulfur dioxide or particulates, a State may develop any measures to prevent significant deterioration, and EPA must approve the State's plan if it determines that the State's plan will carry out the purposes stated above at least as effectively as an area classification plan.

INITIAL CLASSIFICATION OF AREAS--Initially most areas which are cleaner than the ambient standards would be classified as Class II. Mandatory Class I areas are restricted to national parks and national wilderness areas, which exceed 25,000 acres in size. Wilderness areas, national parks and international parks, monuments, 10,000 and 25,000 acres, national preserves, national monuments, national recreation areas, and national primitive areas in excess of 25,000 acres would be Discretionary Class I areas. These areas would convey Class I status initially with subsequent reclassification to Class II possible at the discretion of the State.

RECLASSIFICATION OF AREAS--States would be free to reclassify areas as Class I, II, or III at any time. Reclassification of a Federal area initially classified as Class I and reclassification of any areas to Class III must be approved by appropriate local governments and the State legislature, must not interfere with the classification of any other area, and must be preceded by a public hearing and preparation of an analysis of the health, environmental, economic, social and energy effects of the proposed reclassification. Discretionary Class I areas may only be reclassified as Class II.

EPA is not authorized to disapprove any State's reclassification, unless it violates one of the aforementioned requirements or limitations.

EFFECT OF AREA'S CLASSIFICATION--Depending on an area's classification, the following limitations will apply:

ALLOWABLE POLLUTION INCREMENTS AND ALLOWABLE POLLUTION CEILINGS	
Allowable Increments:	Allowable ceilings:
Class I--2 percent of lowest national standard (all pollutants, except particulate), 10 percent of lowest national standards for (particulate).	90 percent of lowest national primary standard (all pollutants).
Class II--25 percent of the lowest national standard (all pollutants).	Do.
Class III--50 percent of lowest national standard (all pollutants).	Do.

An "allowable increment" is the permissible increase in pollution in any area above a baseline pollution level, calculated to exist, assuming (1) plant capacities in being on January 1, 1975, and (2) additional plant capacities for new sources which receive new source permits prior to date of enactment. (The baseline level is not limited to, but includes, the natural pollution levels in existence prior to any industrial activity). Sources in existence on date of enactment will not be subject to control under this section. No rollback in emissions from existing sources would be required, whether an area is classified as Class I, II, or III.

A Governor is authorized to grant a variance or exclusion, so as not to count against the allowable increment, if pollution increases are due to: (1) coal conversions or natural gas curtailments; (2) particulates due to construction or other temporary activities, such as seasonal open burning; (3) new foreign sources; and (4) background or naturally occurring particulates.

An "allowable ceiling" are absolute pollution levels which may not be exceeded as a result of increases in pollution. New sources would not be permitted to cause or contribute to air pollution concentrations exceeding 90 per cent of the lowest national primary ambient air quality standard in any area, regardless of whether the area is classified I, II, or III.

The National standard to prevent significant deterioration is a single set of increments, which are taken from EPA's regulations covering the agency's so-called Class II areas.

Increments are the same for all nondeterioration areas, thus providing equity for all areas. It is measured from the baseline ambient air quality defined as follows: (Title III, Section 33--Definitions)--"Baseline air quality concentration" is the level of ambient air quality which exists as of the date of the first application for a permit in the area under the nondeterioration provisions.

AMBIENT AIR QUALITY STANDARDS AND NO SIGNIFICANT DETERIORATION INCREMENTS

[In micrograms per cubic meter]

Pollutant	Primary standard	Secondary standard	Class II increment	Class I increment
Particulate matter:				
Annual geometric (mean)	75	80	10	5
24-hour	260	150	30	10
Sulfur dioxide:				
Annual arithmetic (mean)	80		15	2
24-hour	385		100	5
3-hour		1,300	700	25

The increment would be in addition to whatever levels of pollution exist from present sources, natural background, and other activities. When pollution up to the increment would produce ambient air exceeding any primary or secondary standard, the full increment may not be used, and the national ambient standards set the ceiling for additional ambient pollution.

PERMIT PROVISIONS--New or modified major stationary sources are required to obtain a State permit prior to construction. A major stationary source is defined as having a design capacity to emit 100 tons or more pollutant per year.

The permit program is to be operated by States. States may issue permits based on less than one year of prior air quality monitoring, if EPA finds that an adequate analysis of the air quality impact of any major stationary source can be achieved within a shorter period or that such data is available.

# PERMIT PROVISIONS

Each new source with the potential to emit more than 100 tons of a pollutant per year and identified by category in the statute must apply to the State for a permit to construct in a Class I area. EPA is informed of the application and gives notice of it to Federal Land Managers and supervisors of potentially affected Class I areas.

Any Federal Land Manager or supervisor of an affected Class I area, or EPA, or a Governor of an adjacent State if authorized to notify the State of potential adverse impact on air quality within the Class I area with a statement identifying potential impacts from the proposed facility. In the absence of such notice, the applicant is required only to meet best available control technology requirements as statutorily defined and show that the Class II increment will not be exceeded.

If there is such notice, the applicant would be required to demonstrate whether Class I increments would be exceeded in Class I areas, and--

If the permit applicant meets the Class I increments, but the Federal Land Manager (not the supervisor) demonstrates to the satisfaction of the State that the applicant's emissions would nevertheless have an adverse effect on air quality-related values of the Federal lands, the State must deny the permit; or

If the permit applicant does not meet the Class I increments but demonstrates, to the satisfaction of the Federal Land Manager (not the supervisor), that there would be no adverse impact on the air quality-related values of the Federal lands, the State may issue the permit.

In the event a dispute occurs over any development or activity in an adjacent State, the Governor of the affected State may request EPA to mediate into negotiations. If this is not successful, EPA shall resolve the dispute.

In the event that the emissions from any new major emitting facility will cause or contribute to a pollutant increase greater than a Class II increment for such pollutant, the EPA shall, and a Governor may, seek injunctive relief to prevent the issuance of a permit or construction of that facility.



## SECTION 5--IMPLEMENTATION PROVISIONS

Amends section 110. Within 8 months after enactment, each State shall adopt and submit a revised plan to implement and enforce the most significant deterioration provisions of this Act, including a permit or equivalent program for major emitting facilities in all areas.

An implementation plan may include enforceable supplemental emission reduction strategies for existing non-ferrous smelters.

It may include land-use controls to maintain or prevent further deterioration from any primary ambient air quality standards, after the energy, environmental and economic impacts of such controls are considered.

## SECTION 4--INFORMATION DOCUMENTS

Adds new subsections to section 108. EPA shall publish within 180 days after enactment informational guidelines on the basic elements of a transportation control planning process.

EPA shall also publish within 180 days information on four basic transportation control measures. Within 1 year, it shall publish information on additional measures including but not limited to those enumerated in the statute, including its assessment of such measures, to be made available to the States and to Federal agencies.

DEADLINES--State plans for control of sulfur dioxide and particulates must be submitted within one year after date of enactment. State plans for other pollutants must be submitted within two years. EPA must approve the plan within four months, if it meets applicable requirements. If not, EPA must propose a plan for that State within four months after disapproval and promulgate it within 90 days (but after notice and public hearing) if the State in the meantime has failed to submit an approvable plan.

## SECTION 109--TRAINING

Prohibit EPA from charging fees for training of personnel employed by State or local air pollution control agencies.

## SECTION 110--REVIEW OF STANDARDS

Requires EPA to review the technical criteria and national ambient air quality standards at least once every two years and to revise the standards and promulgate new ones as appropriate. In deciding whether revision or promulgation of new standards is necessary, EPA must consider the advice of an independent, seven member scientific review committee, including at least one physician, one representative of the National Academy of Sciences, and one person representing State and territorial air pollution administrators.

HR 10498SECTION 111.--NEW SOURCE STANDARDS OF PERFORMANCE

Requires that major new sources use technological means to meet standards and percentage reduction requirements based on the degree of control achievable through use of the best technological system of continuous emission reduction. Provisions: (1) clarify that intermittent or alternative control measures are not permissible means of compliance; (2) indicate that adequately demonstrated technology is to be the basis of the standard, not reliance on use of untreated fuels; (3) require EPA to take into account energy requirements (in addition to costs) in determining which technologies have been adequately demonstrated; and (4) require EPA to consider non-air quality health and environmental impacts in making that determination.

Standards adopted for existing sources under section 111(d) of the Act are to be based on available means of emission control (not necessarily technological) and must, unless the State decides to be more stringent, take into account the remaining useful life of the existing sources.

A Governor is authorized to petition EPA to compel it to issue new source performance standards for industries not yet covered by such standards, to revise priorities for standard setting, to issue revised standards when better technology becomes adequately demonstrated, or to cover unregulated pollutants, Federal new source performance standards or hazardous emission standards.

SECTION 3.--COST OF TECHNOLOGY

Amends section 108(b). The air quality control techniques documents issued by EPA to the States shall include information on the cost of installation and operation, energy requirements, air quality benefits, and environmental impact of the emission control technology.

SECTION 8.--HAZARDOUS EMISSION DESIGN STANDARDS

Amends section 112 by adding new subsection (e). The Administrator is allowed to specify design, equipment, or operational standards for the control of a source of hazardous emissions, where an emission limitation is not possible or feasible.

#### SECTION 112--VARIANCES FOR TECHNOLOGY INNOVATIONS

Authorizes EPA to grant a variance from Federal new source standards of performance in order to encourage development and application of new, improved, but as yet not adequately demonstrated, technological systems for meeting the standards.

In order to grant the variance EPA must find that there is a substantial likelihood that the new technology would achieve greater emission reduction than presently required or would achieve equivalent emission reduction at lower economic, energy, or environmental costs; that the new technology will not cause or contribute to an unreasonable risk to health, welfare, or safety; that the Governor of the State where the new source intends to locate consents to the variance; and that all national ambient air quality standards will be attained and maintained. The number of variances must be limited to the amount necessary to test the new technology.

A variance is limited in duration to ten years from date of issuance or the date on which EPA finds the new technology is an irreparable failure, whichever is sooner. In case of the latter, EPA is required to allow additional time for the source to obtain and use technology which has been adequately demonstrated to meet the standards.

#### SECTION 113--FEDERAL FACILITIES

Clarify that section 118 of the existing Clean Air Act constitutes a waiver of sovereign immunity, such that Federal facilities and persons operating them must comply with all State and local air pollution control requirements; clarifies that the Federal facilities must comply with "procedural" as well as "substantive" requirements; and authorizes enforcement and sanctions against such facilities and persons by the same means as for any non-Federal source.

These requirements continue to be subject to the President's authority to grant exemptions under section 118 of the existing Act.

#### SECTION 114--WAIVER OF MAINTENANCE OF EFFORT

Authorizes EPA to waive the maintenance of effort requirement in existing law (and thus to continue giving State and local program grants), if there is good cause for granting such a waiver. This would permit continued Federal assistance to State or local air pollution control programs, where fiscal emergencies have necessitated general across-the-board reductions in State and local spending.

#### SECTION 14--FEDERAL AGENCY COMPLIANCE

Clarifies section 118 to provide that all Federal facilities must comply with all substantive and procedural requirements of applicable State implementation plans.

#### SECTION 1--PROGRAM SUPPORT GRANTS

Amends section 105. A State air pollution agency whose budget is reduced as part of an overall State budget reduction shall not lose its Federal grants under the existing requirement that such Agency must maintain its level of effort from a previous year in order to receive Federal grants.

## SECTION 12--INTERNATIONAL POLLUTION ABATEMENT

Section 115 is amended so that it provides only a mechanism for abatement of air pollution arising in this country and endangering the health or welfare of persons in a foreign country. The recommendations of any abatement conference conducted before enactment of these amendments continue to be in effect unless rescinded on grounds of obsolescence.

## SECTION 13--PRESIDENT'S ADVISORY BOARD

Abolishes the President's Advisory Board. Advisory committees for implementation of the Act, and compensation for their members are continued.

## SECTION 11--EXPANSION IN NATIONAL AMBIENT AIR QUALITY STANDARD AREAS

(New subsection (g) to section 113 of existing law.) Establishes an exception for facilities proposed for construction or modification at an existing site or plant owned or controlled by the owner or operator of the proposed facility in which any ambient air quality standard is exceeded if the proposed facility will emit air pollutants so as to prevent the attainment or maintenance of such standard. This exception may be granted by a State where the owner or operator demonstrates that: (a) the proposed facility will utilize the best available control technology; (b) all existing sources owned or controlled by the owner or operator of the proposed facility which are in the same air quality control region as the proposed facility are in compliance either with all applicable emission limitations or with an approved schedule and time table for compliance under the implementation plan or an enforcement order issued under new section 113(d); (c) the total cumulative emissions from the proposed facilities and the existing facilities at the proposed new facility location will at no time increase; and (d) the total allowable emissions from existing and proposed sources at the facility location after construction of the proposed facility will be sufficiently less than the total allowable emissions under the original implementation plan so as to represent reasonable further progress toward attainment of the ambient air quality standard, taking into account progress already made toward attainment of that standard.

After January 1, 1979, the exception can be granted only where all existing sources in the region owned or controlled by the owner or operator of the proposed facility are actually in compliance with all emission limitations under the applicable implementation plan.

## SECTION 115--VARIANCES FOR INDUSTRIAL EXPANSION OR GROWTH

Authorizes the States or EPA to grant a variance which would permit new construction or expansion of existing facilities in areas that still exceed ambient standards after the specified attainment date. A company which owns or operates existing sources would be permitted to obtain such a variance if it shows that all existing sources owned by are in compliance with emission limits or schedules for compliance. The proposed new or expanded facility would have to be equipped with the best available control technology.

At no time would a variance be permitted to increase allowable emission levels by more than 15 per cent of that permitted by the State plans. By 1980, the company's total emissions from the new and existing facilities could not exceed 100 percent of what would have been allowed from the existing facilities alone. No variance under this section would have the effect of delaying the date that the national ambient standards would be attained.

## TITLE II

## SECTION 201 -- LIMITATIONS ON INDIRECT SOURCE REVIEW AUTHORITY

Limits EPA's authority to require State or local governments to adopt or implement indirect source review programs. An indirect source is a facility or property which although it does not directly pollute the air, does attract traffic in sufficient amounts to cause or contribute to unhealthy levels of air pollution.

1. Before an indirect source review program may be required to be implemented in any area, EPA must find that such a program is necessary, i.e., that the national primary ambient air quality standards will be exceeded after the statutory deadlines for attainment and maintenance of such standards notwithstanding for new motor vehicle emission standards and application of direct stationary source and transportation controls. In making the finding of necessity, EPA is directed to assume that the requirements originally applicable to 1975 and 1976 new cars under the 1970 Act were met on time, instead of delayed.
2. EPA may not require such a program unless it is likely to assist in attaining or maintaining the primary (health) standards. In making this finding, EPA must take into account the advice of the National Academy of Sciences, which is directed to undertake an independent study of this issue.
3. EPA also must follow the procedural requirements established under section 305 of the bill. Finding of EPA pertaining to the efficacy and necessity of indirect source review programs would be subject to judicial review in connection with review of any regulation promulgated by EPA.
4. Even if such programs are found to be necessary and effective and even if procedural requirements are met, EPA may not impose or administer Federal regulations for indirect sources, but are to be carried out by State or local governments. If a State fails to adopt or enforce an adequate program, EPA may seek a court order for the State to carry out such a program, petition the court to prevent construction of new indirect sources which do not have permits from approved State programs, or both. The only exception to the rule against Federal implementation of indirect source review programs is with respect to indirect sources owned, operated or assisted by the Federal Government.
5. EPA is not authorized to review the State's individual indirect source permit decisions. Only if the State improperly granted permits in a substantial number of instances could the Administrator act to disapprove a program previously approved under this section. Even then, the effect of the disapproval would only be prospective; permits which had previously been issued by the State could not be revoked.



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6. EPA must permit Governors to grant variances from Federally-approved State programs under certain specified conditions, even though the effect of such variances is to permit air pollution levels in excess of the primary (health) standards. Variances may last until as late as January 1, 1985, in the Governor's discretion. At the expiration of any variance, the indirect source will be required to conform to the State's implementation plan, which must then attain and maintain primary standards.

7. Under the statutory timetables, indirect source review programs would probably not become effective until 39 months after date of enactment. During this period, States and localities would be free to revoke or suspend any existing indirect source programs or to adopt and enforce any indirect source program. EPA may not compel or prohibit any such action during this interim period.

Amendment deletes from the Act the words "and use " controls. Where necessary for attainment or maintenance of national ambient air quality standards, air quality maintenance plans and preconstruction review of direct pollution sources are provided. Even these measures could not be required if a State adopts a plan which is adequate to assure timely attainment and maintenance of the national ambient standards without such measures.

#### SECTION 202 -- EXTENSION OF TRANSPORTATION CONTROL COMPLIANCE DATES

Authorizes EPA to extend the deadlines for implementation of various transportation control measures which, under current law, are required to become effective not later than June 30, 1977, if such control measures could not be implemented in accordance with current timetables without serious social or economic disruption, then EPA may grant an extension.

An extension may last until as late as January 1, 1985. It may be granted even though failure to implement the measure as originally scheduled would cause or contribute to pollution levels exceeding national primary ambient air quality standards.

A measure thus extended must be implemented according to a new compliance schedule, in general, as expeditiously as practicable. Extensions beyond January 1, 1980, are authorized only where commitments are made as part of the plan to improve public transportation.

In addition to the extensions authorized by this section, the delegation of certain measures from Federally-approved State plans involving certain gas rationing provisions and certain vehicle retrofit requirements applicable to in-use vehicles is authorized. A State's plan that is no longer adequate to assure timely attainment and maintenance of the national primary standards without such strategies would have to be revised within nine months.

#### SECTION 7 -- EXTENSIONS FOR TRANSPORTATION CONTROL PLANS

Amends section 110 by adding a new subsection (h). Upon application of a Governor, EPA may grant an extension of up to 5 years for the attainment of primary ambient air quality standards in an area requiring transportation controls where their implementation without an extension would have serious adverse social and economic effects. EPA may grant an extension only if the State (1) has implemented or will have implemented by June 1, 1977, its plan requirements applicable to stationary source or mobile source-related pollutants; (2) will have begun to implement by June 1, 1977, all reasonably available transportation control measures in its plan; and (3) will have completed by June 1, 1978, a detailed planning study of alternative control measures.

Any State which receives an extension must submit to EPA by June 1, 1978, a revised plan prepared where possible by an organization of local elected officials designated by the State. The plan must provide for attainment of primary ambient air quality standards as expeditiously as practicable but not later than May 31, 1982, unless such attainment is not possible through implementation of all reasonable and available control measures.

In such a case, the Governor may apply on or after June 1, 1981, for a further extension, which shall run no later than May 31, 1987.

An extension of any transportation control measure does not provide basis for EPA to require revision of a State plan. The State may not be required to include more stringent measures if its plan would have been adequate but for the granting of any extension under this section.

EPA is required to review all State plans not later than one year after enactment, to determine their adequacy. If the State plan is not adequate even assuming no delays had been granted under these amendments, then the plan would have to be revised by the State, in accordance with provisions of existing law.

The term "transportation control measure" is defined to exclude all regulation of parking, which is subject to the limitations of section 20.

#### SECTION 203 -- LIGHT-DUTY MOTOR VEHICLE EMISSIONS

Delays statutory emission standards for new automobiles and other light-duty vehicles (requiring a 90% reduction in HC and CO emissions) until model year 1980. During model years 1978 and 1979, standards would be frozen at 1975 Federal interim standards. 90% reduction would be required for HC and CO in model year 1980, the full 90% reduction for NOx would not have to be achieved until model year 1981. Even then, EPA would be authorized to suspend the NOx standard (for model years 1981-84), setting higher interim levels upon a determination that: (1) it is not technologically feasible to meet the standard within the time permitted; or (2) meeting the 90 percent reduction requirement would result in an excessive fuel penalty.

When EPA denies an extension because a State has not met the minimum requirements specified or when a Governor has not applied for an extension, EPA shall promulgate an implementation plan after consultation with State and local elected officials. A State may apply to the appropriate U.S. Court of Appeals for a stay of any provision of such plan pending review.

Grants shall be available for 2 years to any local transportation or air quality planning organization, for 100 percent of the additional costs of developing a transportation control plan.

EPA shall not approve any projects or award any grants under any authority after June 1, 1977, to a State which requires an extension and has not applied for one.

If a State does not implement a requirement of an approved plan, EPA shall cumulatively decrease by 15 percent annually the funds for any project authorized by it.

No Federal agency shall support in any way an activity not in conformance with a plan requirement. All Federal programs with air quality-related transportation effects shall give priority to the implementation of transportation control measures.

#### SECTIONS 18, 19, and 20 -- AUTOMOTIVE EMISSION STANDARDS

Amends section 202. The 1978 deadline for achievement of the hydrocarbon and carbon monoxide auto emission standards, which reflect a 90 percent reduction from 1970 emission levels, is extended to 1979. Existing 1977 interim standards of 1.5 grams/mile hydrocarbons and 15 grams/mile carbon monoxide are extended through 1978.

The nitrogen oxide (NOx) emission standard is modified from the 90 percent reduction requirement effective in 1978 to 1.0 grams per mile NOx, effective in 1980 for all automobiles sold in the United States. The existing 1977 interim NOx standard of 2.0 grams per mile is extended through 1978 and 1979, but each manufacturer must produce 10 percent of 1979 light duty vehicles to the 1980 NOx standard of 1.0 grams per mile. Any manufacturer whose production represents less than 3 percent of world sales of light duty motor vehicles is exempt from the requirement of a 1.0 grams per mile NOx emission standard in 1979.



AUTO EMISSION STANDARDS TIMETABLE ESTABLISHED BY THE  
CLEAN AIR AMENDMENTS OF 1976

Applicable Federal standards would be as follows:

Model Year	Emissions (grams per mile)		
	HC	CO	NOx
1975-76	1.5	15.0	3.1
1977-79	1.5	15.0	2.0
1980	.41	3.4	2.0 (1)
1981-84	.41	3.4	.4 (1)
1985	.41	3.4	.4

(1) With possible waiver.

EPA would be authorized to grant up to four one-year suspensions of the NOx standard. The maximum allowable interim standard would be as follows:

NOx g/ml

1981	2.0
1982	2.0
1983	1.5
1984	1.5

EPA is authorized to grant one or more waivers of the 90 per cent reduction requirements for HC, CO, or NOx for model years 1980-4, if (1) a sulfate emission standard is promulgated by EPA, and (2) it is not feasible to meet the HC, CO, NOx, and sulfate standards, or meeting all these standards would result in an excessive fuel penalty.

The full 90 per cent reduction in NOx would not have to be achieved under a separate provision of this section. If the manufacturer of any model could demonstrate that its vehicles could meet the following standards for 10 years or 100,000 miles (instead of the usual five years or 50,000 miles), then compliance with the .4 NOx standard would not be required for that model.

g/ml

HC	0.41
CO	3.4
NOx	1.0

EPA is required to study and report annually to Congress on unregulated pollutants being emitted from various systems (controlled and uncontrolled).

It is a prohibited act for any manufacturer seeking a suspension to have failed to make maximum feasible efforts to develop a system which could meet the standards without an excess fuel penalty.

SECTION 21 -- NITROGEN OXIDE RESEARCH OBJECTIVE

Amends section 202(b). The .4 gram per mile NOx standard which reflects a 90 percent reduction from uncontrolled emission levels becomes a research objective. EPA must promulgate regulations within 180 days after enactment which require each auto manufacturer with domestic sales of at least .5 per cent of total domestic sales to build demonstration vehicles to meet a .4 gram per mile NOx level. Such vehicles shall be submitted to EPA no later than model year 1978 and in each model year thereafter.

SECTION 204 -- EMISSIONS FROM HEAVY-DUTY VEHICLES OR ENGINES  
AND FROM MOTORCYCLES

Requires EPA to promulgate emission standards for model year 1978-1984 new heavy-duty trucks, buses, and motorcycles based on use of the best technology which has been adequately demonstrated. For 1985 and subsequent model years, standards must require a 90 per cent reduction of hydrocarbons (HC), carbon monoxide (CO), and a 85 per cent reduction of oxides of nitrogen (NOx) from baseline levels, i.e., uncontrolled levels emitted by gasoline-powered vehicles or engines of a comparable class or category. These standards would apply both to gasoline and diesel-powered vehicles and engines.

Upon making certain findings regarding technical infeasibility or fuel economy penalties, the Administrator may in 1979 grant a revision of the 1985-7 standards for any class or category of vehicles or engines. Additional revisions of up to three years each could be granted at three-year intervals thereafter if the requisite findings are made. At the end of each revision period, the standards would revert to a requirement for reductions of 90 per cent for HC and CO and 35 per cent for NOx.

Specific health studies are to be undertaken on HC, CO, NOx, and particulates. If these studies justified setting other targets, then the 90 per cent reduction figures for HC or CO or the 85 per cent reduction figure for NOx could be changed or a particulate target level set.

A vehicle or engine failing to meet the revised standards may nonetheless be permitted to be sold so long as the degree of non-conformity is within a range prescribed by rule by EPA, and the manufacturer pays a nonconforming technology penalty. Production line testing of heavy-duty vehicles or engines is required.

In setting and revising standards under this section, EPA may subdivide heavy-duty vehicles or engines into classes or subclasses, by appropriate factors.

The term "heavy-duty vehicle" is defined to mean vehicles (including trucks and buses) weighing over 6,000 pounds. It excludes fixed rail vehicles and vehicles which are not designed primarily for use on highways or roads.

SECTION 17 -- NEW HEAVY DUTY VEHICLES AND MOTORCYCLES

Amends sections 202 and 206. EPA shall promulgate interim emission standards for hydrocarbons, carbon monoxide, particulates, and nitrogen oxides from heavy duty trucks, buses, and motorcycles applicable in model years 1979 and 1980, and possibly in 1978 if EPA finds such early application appropriate. Standards shall reflect application of best available technology taking into account the cost of compliance.

For model year 1981 and thereafter, EPA shall promulgate emission standards for motorcycles, heavy duty trucks, and buses which reflect the degree of reduction required for light duty vehicles in 1980 under section 202(b). Required reductions for heavy duty vehicles over 10,000 pounds shall be calculated from uncontrolled emission levels of gasoline-powered heavy duty vehicles. EPA may substitute standards based on best available technology if it finds that technology to achieve reduction equivalent to light duty vehicle requirements is not available, provided that such modified reduction is more stringent than the 1978-1980 interim standards.

SECTION 22 -- NATIONAL ACADEMY OF SCIENCES STUDY

Amends section 202(c). EPA shall contract with the National Academy of Sciences for continuing studies on health effects of auto-related pollutants, including sulfur compounds, and on the technological feasibility of achieving emission standards set for such pollutants.

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## SECTION 23 -- USEFUL LIFE FOR MOTORCYCLES

This section amends section 202(d) to provide that the useful life of any motorcycle and any motor vehicle or motor vehicle engine not included in the light duty vehicle category shall be determined by EPA.

## SECTION 205 -- AIRCRAFT EMISSION STANDARDS

Authorizes the Secretary of Transportation to disapprove at any time any aircraft emission standard promulgated by EPA, if DOT finds the standard would create a hazard to aircraft safety. If DOT disapproves, then the emission standard would cease to be effective or may not take effect. EPA must promulgate standards for non-military supersonic aircraft within 12 months of date of enactment.

## SECTION 206 -- ASSURANCE OF PROTECTION OF PUBLIC HEALTH AND SAFETY

Requires the manufacturers of new motor vehicles or new motor vehicle engines to bear the burden of proving as a condition of obtaining a certificate of conformity, that the emission control systems or devices that are to be used to meet emission standards will not produce unregulated pollutants in concentrations which create an unreasonable risk to public health or welfare. The manufacturer must also prove the safety of any such system or device.

## SECTION 207 -- TEST PROCEDURES FOR MEASURING EVAPORATIVE EMISSIONS

Requires EPA to use test procedures which measure all evaporative emissions, effective for model year 1978 light-duty vehicles (and 1978 or later for heavy-duty vehicles or engines).

## SECTION 208 -- RAILROAD LOCOMOTIVE EMISSION STANDARDS

Establishes a new part C of title II of the Clean Air Act (new sections 235-7). It directs EPA to study the extent to which emissions from railroad locomotives affect air quality and the technological feasibility of controlling them. Within one year after date of enactment, EPA would be required to promulgate national emission standards for railroad locomotives and equipment.

The Secretary of Transportation may disapprove any emission standard under this section promulgated by EPA if he finds it would create a hazard to railroad safety. The Secretary of Transportation also is responsible for enforcing railroad emission standards.

Once standards are promulgated States and local governments would be preempted from adopting or enforcing emission standards which are not identical to the Federal standards.

## SECTION 28 -- PRODUCTION LINE TEST

Amends section 206(b)(1). EPA is required to establish, within 6 months after enactment, a test procedure to implement a production line test of new light duty motor vehicles. Such production line test shall be implemented no later than model year 1977.

## SECTION 32 -- RAILROAD LOCOMOTIVE EMISSION STANDARDS

Adds new part C to title II. Within 90 days after enactment, EPA shall commence a study and investigation of the air quality impacts of emissions from railroad locomotives, locomotive engines and secondary power sources on rolling stock, and of the technological feasibility of controlling such emissions. Within 180 days later, EPA shall publish such study and propose emission standards for any air pollutant from such sources reflecting the degree of emission reduction achievable through application of the best available technology taking into account the cost of compliance.

Within 90 days of proposal and after public hearings, the regulations shall be promulgated, to become effective when the technology is available for application, the Secretary of DOT that the requisite technology is available for application, taking into account the cost of compliance within such period.

After such regulations become effective, the Federal emission standards are preemptive.

# SECTION 209 -- MOTOR VEHICLE PARTS CERTIFICATION AND STUDY BY FTC

(1) Changes the duration of the performance warranty under section 207 (b) from 3 years or 50,000 miles to 18 months or 18,000 miles. The design warranties under section 207 (a), the recall authority under section 207(c), the certification and assembly-line test provisions under section 206, and the useful life definition under section 202(d) are not affected by this change.

(2) Requires EPA to promulgate regulations within two years after date of enactment establishing a voluntary parts certification program, whereby the manufacturer of any motor vehicle part could certify that use of that part in specified vehicles or engines would not result in a failure of the vehicle to meet emission standards. Use of a certified part would not invalidate the customer's performance warranty, even though it may have been manufactured and sold by an independent parts supplier and installed by an independent garage.

(3) Requires the Federal Trade Commission to study regulations promulgated by EPA. If the FTC finds that in light of these regulations no significant anti-competitive effects would result from a 5 year/50,000 miles performance warranty, then the 5-year/50,000-mile performance warranty would be restored.

## AFTERMARKET PROVISIONS

### SECTION 25 -- MAINTENANCE INSTRUCTIONS

Amends sections 203 and 207. The manufacturer is required to furnish to the ultimate purchaser of a new motor vehicle written instructions for proper maintenance and use of the vehicle which conform to the regulations which EPA shall promulgate.

Such instructions shall not include any condition on the use of any component of service identified by brand, trade or corporate name. Nor shall the instructions distinguish in any way between service performed by an agent of the manufacturer and service performed by independent automotive repair facilities. This prohibition may be waived by EPA if the manufacturer satisfies EPA that such component or service is essential for the proper functioning of the vehicle and EPA finds that such a waiver is in the public interest.

The manufacturer must also affix a label to each such vehicle indicating that it conforms with applicable emission standards. The label shall contain such other information as EPA shall prescribe by regulation.

### SECTION 28 -- MOTOR VEHICLE CERTIFICATION

Amends section 207. EPA must promulgate regulations implementing a program to certify that motor vehicle parts made by other than an auto manufacturer will meet the performance standards of the original equipment installed by the manufacturer.

No warranty shall be invalid on the basis of use of any such certified part.

### SECTION 29 -- AFTERMARKET COMPONENTS

Amends section 203(a)(4). The manufacturer may not condition the warranty of an emission control system upon the use of any component, system or service of such manufacturer unless EPA finds under section 207(c)(3) that such specific component or service is essential to the proper functioning of the vehicle.

### SECTION 27 -- REPLACEMENT COST

Amends section 207(a)(1). The cost of any light duty motor vehicle part or component for emission control which is scheduled for replacement during the useful life of the vehicle and which has a retail price greater than \$75, shall be included in the original purchase price of the vehicle and provided without cost to the ultimate purchaser when it is replaced.

SECTION 39 -- WARRANTY STUDY

A study of the impact on competition of any warranty required pursuant to the Clean Air Act shall be made by the Bureau of Competition of the Federal Trade Commission, in consultation with the Bureau of Consumer Affairs, EPA and the Department of Justice. It shall include analyses of any measures taken by EPA to prevent or diminish potential impacts of warranty requirements on competition, and of the potential competitive impact of a warranty applicable over the actual useful life of a vehicle. Public hearings shall be included.



## SECTION 210 -- VEHICLE INSPECTION AND MAINTENANCE

Requires annual inspection of light-duty vehicles which are registered to persons who live or maintain their principal place of business in an air quality control region where transportation control measures apply as of June 30, 1975.

Establishes standards applicable to in-use vehicles but do not apply to pre-1968 vehicles, antique cars, and certain other vehicles.

If a vehicle is found not to be in compliance with the standards as a result of the emission inspection, then the operation or registration of the vehicle would be prohibited, with certain exceptions, as follows: (1) a noncomplying vehicle is brought into compliance within a temporary period to permit the vehicle to be brought into compliance; and (2) a noncomplying vehicle may be operated and registered if it has received a pass-up within three months prior to the inspection or thereafter. States would retain authority to impose more stringent requirements, but EPA would not be authorized to compel the States to do so.

The inspection requirements will become effective one year after date of enactment. Use of existing State motor vehicle inspection and testing facilities is encouraged, but it is not required.

If, at any time a State plan becomes adequate to attain and maintain the national ambient air quality standards in timely fashion without reliance on vehicle inspection and maintenance, then such a system would not be required.

## SECTION 211 -- COSTS OF VAPOR RECOVERY

Provides that the costs of vapor recovery systems be borne by the owner of the storage tanks and pumps, not by the franchise retailer, and prohibits such owner from transferring the costs of vapor recovery to the retailer in the lease, although costs may be passed through general increases in the price of the product. The distributor is required to reimburse the retailer for any such costs incurred prior to date of enactment. A four-year phase-in period for small independent marketeers to install vapor recovery systems where required is permitted.

## SECTION 212 -- TESTING BY SMALL MANUFACTURERS

Exempts vehicle manufacturers with projected annual U.S. sales of 300 or less from the requirement for 50,000 mile certification testing of such vehicles.

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## SECTION 213 -- CALIFORNIA WAIVER

Affirming California's full authority under existing Section 209 of the Act, permits the State to have its standards considered as a package and would require EPA in most instances to waive the preemption under section 209, EIA would be authorized to deny such waiver only if (1) California's judgment that its standards, considered together, are at least as protective of health and welfare as federal standards, considered together, was arbitrary and capricious; or (2) one of the findings under existing section 209 (b) is made.

## SECTION 214 -- LOW EMISSION VEHICLES

Provides that low emission vehicles may be considered as suitable substitutes for existing vehicles, even if a full range of potential uses is not achievable by each low-emission vehicle, thus expanding existing regulations.

## SECTION 215 -- REMOVAL OR TAMPERING WITH CERTAIN DEVICES

Expands the existing prohibition on removal or rendering inoperative of pollution control devices or systems which are needed to meet new motor vehicle emission standards; any person engaged in the business of vehicle repair or service who knowingly takes such action would be subject to a civil penalty, including independent gas stations and garages. If the person taking such action is an individual working on his own vehicle, that action would not constitute a violation.

Provides that use of parts other than original equipment manufacturer parts for purposes of repair or replacement would not be construed in and of itself to constitute prohibited tampering with emission control systems, devices, or elements of designs.

## SECTION 24 -- TAMPERING

Amends sections 203 and 205. The existing prohibition on the removal of or tampering with emission control systems by a manufacturer or dealer prior to sale and delivery of a motor vehicle is extended to tampering following sale and delivery of a motor vehicle. The prohibition covers repair and service shops and selling, leasing, trading and fleet operations, which are subject to a civil penalty of not more than \$2,500 for a violation of this provision.



#### SECTION 216 -- HIGH ALTITUDE PERFORMANCE ADJUSTMENTS

Authorizes adjustments to the emission control system of any vehicle or engine which improve fuel economy performance while not harming the emission control performance of the system. Requires vehicle manufacturers (or EPA) to publish instructions as to how much adjustment can be made.

#### SECTION 217 -- PARTS STANDARDS; PREEMPTION OF STATE LAW

Provides that if a Federal part certification program is established under section 209 of the bill, then any part certified under the Federal program would not have to be recertified under any State or local program.

#### SECTION 218 -- FILL PIPE STANDARDS

Authorizes EPA to prescribe fill pipe standards for new motor vehicles to assure effective connection between the fill pipe and any certified vapor recovery system. Adequate lead time must be allowed for compliance with these standards. EPA would not be authorized to regulate motor vehicle body design.

#### SECTION 219 -- ONBOARD HYDROCARBON TECHNOLOGY

Requires EPA to consider the feasibility and desirability from a cost/effectiveness viewpoint of prescribing standards for new motor vehicles to require use of onboard hydrocarbon control technology to minimize or avoid the necessity for vapor recovery requirements. If it makes certain findings concerning costs, fuel economy, feasibility, etc., it is directed to promulgate such standards. Adequate lead time must be allowed for compliance. Regulations could be disapproved by the Secretary of Transportation on a finding that a hazard to safety would be created.

#### SECTION 30 -- PREEMPTION

Amends section 209. Any State in which a region or portion thereof is identified as not meeting a primary ambient air quality standard for a mobile source-related pollutant on the date of enactment may adopt and enforce for model year 1979 the 1.0 gram per mile NOx standard which is otherwise effective in 1980 for all light duty vehicles.

#### SECTION 31 -- SULFUR EMISSIONS

Amends section 211. EPA shall conduct a 1 year study of sulfur compounds emissions from motor vehicles and aircraft. Health and welfare effects of such emissions are to be reviewed and alternative control strategies analyzed. Such study shall be reported to Congress by July 1, 1971.

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TITLE IIIHR. 10498TITLE III**SECTION 301 -- REDESIGNATION OF AIR QUALITY CONTROL REGIONS**

Authorizes the Governor of each State to revise the boundaries of air quality control regions designated under the 1970 Act.

The boundary revisions are to be effective only with the approval of EPA (and, in certain instances, the approval of Governors of nearby States which may be affected by any such revision).

**SECTION 302 -- CONSULTATION**

Requires a consultation process to be established within each State to assure adequate opportunity for general purpose local governments and regional agencies to present their views prior to adoption of specified measures which are of particular concern to such governmental entities.

The consultation process may take a variety of forms, so long as it adequately involves local governments and regional agencies in the State's decision-making.

**SECTION 303 -- DELEGATION TO LOCAL GOVERNMENT**

To minimize the necessity for Federal enforcement, this provision would authorize EPA to delegate concurrent enforcement authority to local government in the case of a plan promulgated by the Administrator.

**SECTION 304 -- EMPLOYMENT EFFECTS**

Provides for EPA to investigate, report and make advisory recommendations concerning employer allegations that requirements under the Clean Air Act will adversely affect employment. No sanction or enforcement authority is provided.

**SECTION 305 -- ADMINISTRATIVE PROCEDURES AND JUDICIAL REVIEW**

Establishes comprehensive procedures for most informal rulemaking under the Clean Air Act, which would apply in lieu of the Administrative Procedure Act: (a) specifies the rules and actions to which such procedures will apply; (b) provides for establishment of a rulemaking docket for each of these rules or actions; (c) indicates what the record will be for EPA in prescribing the rule and for the courts in reviewing the rule; (d) establishes procedural rights and opportunities for public participation in the rulemaking process, including opportunities for cross-examination on material issues of disputed fact; (e) provides the standards of judicial review, including the 'substantial evidence' test; (f) modifies certain deadlines for promulgation of rules; and (g) extends to 60 days the period of petitioning for judicial review of any such rule.

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## SECTION 306 -- EMPLOYEE PROTECTION

Establishes a new section 317 to protect employees from retaliatory action by employers, if the employee is assisting in the administration of, or exercising rights under, the Clean Air Act.

## SECTION 36 -- EMPLOYEE PROTECTION

Adds new section 314. Offers protection to employees who believe they have been fired or discriminated against as a result of the fact that they have testified or brought suit under this Act. The employee may apply to the Secretary of Labor for review of his case. The Secretary of Labor can issue an order for the employee to be rehired, or otherwise compensated, if the employee's case is justified. The section does not apply to an employee who acts outside the direction of his employer.

At an employee's request, EPA shall investigate threatened plant closure or reductions in employment allegedly resulting from any Clean Air Act requirement, including public hearings on the record. Such hearings shall be the basis for findings of fact and recommendations by EPA.

## SECTION 307 -- NOTICE TO STATES IN CASE OF CERTAIN INSPECTIONS, ETC.

Requires EPA to give notice to States prior to undertaking certain actions, including inspections, where EPA intends to check on compliance with a standard adopted by the State and approved by EPA.

## SECTION 308 -- EMERGENCY PROVISIONS

Requires EPA to consult with States prior to commencing any emergency action. Authorizes issuance of emergency orders where public health cannot be adequately protected solely by initiating a suit for injunctive relief.

## SECTION 309 -- INTERSTATE POLLUTION ABATEMENT

Provides for a system of interstate notification and permits for major new sources which may significantly contribute to interstate air pollution, and a mechanism for resolving disputes on abatement of interstate air pollution.

## SECTION 310 -- INTERAGENCY COOPERATION ON PREVENTION OF ENVIRONMENTAL CANCERS, HEART AND LUNG DISEASE

Requires creation of an interagency task force to promote increased cooperation between EPA and HEW to quantify the relationship between environmental pollution and cancer, heart and lung disease and to find methods for preventing environmentally-induced cancer, heart, and lung diseases.

CRS-25

## SECTION 31 -- CIVIL LITIGATION

Authorizes attorneys appointed by EPA to represent the Agency in civil litigation under this Act. EPA's attorneys would not be authorized to appear in criminal cases (nor in the Supreme Court if the Solicitor General agrees to appear on behalf of the Agency).

Provides that the courts may award reasonable attorneys fees to any persons against whom EPA acts unreasonably in initiating enforcement action. Attorneys fees and other costs (witness fees, etc.) could also be awarded in judicial review proceedings under section 307 of the Act.

## SECTION 32 -- FINE PARTICULATE STUDY

Requires EPA to study and report to Congress in 18 months on health hazards and means of controlling fine particulates. The National Academy of Sciences is to participate in this study. This study is to be coordinated with the study under section 101 and the standards review process under section 110 of the bill.

## SECTION 33 -- AIR QUALITY MONITORING

Requires EPA to promulgate regulations establishing a standard air quality index for monitoring and reporting of air quality data by State and local governments, and to supplement State and local monitoring stations with Federal stations where necessary.

## SECTION 34 -- TECHNICAL AND CONFORMING AMENDMENTS

Includes miscellaneous technical and conforming amendments.

## SECTION 35 -- RESEARCH NOT AUTHORIZED

Clarifies that no money authorized to be appropriated under this Act may be used by EPA for research. Research authorizations are within the jurisdiction of the Committee on Science and Technology.

## SECTION 35 -- COST OF LITIGATION

Amends section 307, in any suit in which the United States is a party, any prevailing party other than the United States shall recover all reasonable costs of its participation in such proceeding. Where such party prevails in part, the court may award reasonable costs.

# SECTION 316 -- STUDY AND REPORT CONCERNING ECONOMIC APPROACHES TO CONTROLLING AIR POLLUTION

Requires the Council on Environmental Quality to conduct a study and to report to Congress on economic measures which might be used to encourage greater or more efficient emission reductions.

# SECTION 317 -- LOSS OF PAY PROHIBITED IN CERTAIN CASES

Provides that one of the conditions for use of supplemental or interim control measures or other dispersion enhancement methods would be that the owner or operator of the source proposing to use such measures or methods agree not to make employees bear any of the costs of periodic shutdowns or production curtailments which may result from use of such methods or measures.

## SECTION 33 -- DEFINITIONS

"Schedule and timetable of compliance" means a schedule of enforceable actions in an implementation plan which lead to compliance with the specified emission limitation or other standard in the plan.

"Major emitting facility" is any stationary source which emits or can emit 100 tons or more per year of any air pollutant, for the purposes of all provisions under the Clean Air Act except the provisions for the prevention of significant deterioration (section 110(g).)

For the purposes of section 110(g), a major emitting facility is any stationary source which emits, or can emit, 100 tons or more per year of any pollutant and which falls within one of the categories specified by this statute or subsequently identified by EPA to be a significant potential source of air pollution.

## SECTION 34 -- CITIZEN SUITS

Section 304 of the Clean Air Act is amended to allow a citizen to bring suit to prevent construction of a major emitting facility without a permit in compliance with section 110(g), the nondeterioration provisions of the Act, or to enforce against any violation of a condition of such a permit or other requirements of the Act such as those of section 110(a)(4) and 110 (g).

## SECTION 37 -- NATIONAL AIR QUALITY COMMISSION

Adds new section 315. A National Commission on Air Quality composed of congressional and public members is set up to study and report to Congress within 3 years on the adequacy of the clean air programs to protect the public health and welfare, and the implications of implementing such programs. A report and recommendation on the auto emissions standard for NOx is required by March 1977.

SECTION 41 -- SAVING PROVISION

Suits, proceedings, regulations, orders, and other items relating to implementation of the Clean Air Act otherwise not affected by provisions of this Act remain in effect.

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## CHAPTER 13

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### TESTIMONY BY ADMINISTRATION REPRESENTATIVES IN HOUSE AND SENATE HEARINGS

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## NOTE

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Administration testimony on proposed changes and new provisions occurred not only during hearings on the 1976 Clean Air Amendments, but also in hearings dealing with other major national issues. Selected statements by Administration witnesses therefore are included from several of the latter to round out the picture of the Administration's views on the most significant proposed provisions.

(7181)



# THE ENERGY CRISIS AND PROPOSED SOLUTIONS

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## PANEL DISCUSSIONS BEFORE THE COMMITTEE ON WAYS AND MEANS HOUSE OF REPRESENTATIVES NINETY-FOURTH CONGRESS

FIRST SESSION  
ON  
THE ENERGY CRISIS AND PROPOSED SOLUTIONS

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MARCH 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, AND 17, 1975

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### Part 3 of 4

Petroleum Supply  
(March 10, 1975)

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Gas and Other Energy Sources  
(March 11, 1975)

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Automobile Efficiency and Conservation  
(March 12, 1975)

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Printed for the use of the Committee on Ways and Means



U.S. GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1975

(7183)

STATEMENT OF JOHN DeKANY, DIRECTOR, EMISSION CONTROL TECHNOLOGY DIVISION, ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH., ACCOMPANIED BY ALBERT FRY, DIRECTOR, POLICY PLANNING DIVISION, ENVIRONMENTAL PROTECTION AGENCY

Mr. DeKANY. Thank you.

Mr. Chairman and members of the committee, I appreciate the opportunity to appear before you today to discuss the technological aspects of automobile fuel efficiency and its relationship to our air pollution control efforts. I am accompanied today by Mr. Albert Fry, Director of the Policy Planning Division within EPA.

We at EPA have a long and continuing involvement in the fuel economy of automobiles. In short, EPA has long been required by law to generate data on motor vehicle performance which, incidentally, includes fuel economy measurements. I have reference, of course, to our testing and certification of vehicles which must meet the emission control requirements established under the Clean Air Act.

In the fall of 1971 EPA began an intensive study of the factors which affect automobile fuel economy. In part this effort was our response to exaggerated claims about fuel economy losses caused by the Federal emission control requirements. As a result of this study we were able to separate out and quantify the several factors which cause fuel economy to vary among cars. The field of fuel economy data has been continuously under review and refinement by our staff since that time.

In the spring of 1973, the President directed EPA to develop fuel economy testing procedures and labeling methods for automobiles. In May of 1973 we published fuel economy data on the 1973 model year vehicles. In September of 1973 and again in September of 1974 we published fuel economy data for the 1974 and 1975 model years, respectively. For the 1975 model year the publication of the fuel economy data and the operation of the voluntary fuel economy labeling program are, as the committee may know, sponsored cooperatively by EPA and the Federal Energy Administration. In that manner we have been able to do a better job of informing the public on this important subject than either FEA or EPA alone could have done.

We believe that these data on fuel economy represent the most reliable data presently available. A recent Government Accounting Office review has determined that the generation of these data by EPA, as an integral part of our emission-testing activities, is far and away the least costly way in which the Federal Government can obtain valid fuel economy data. As we implement the assembly line test requirements of the Clean Air Act, as we expect to do shortly, we will be able to buttress our current fuel economy data base, which comes from emission certification testing, with additional data generated on cars as they leave the manufacturer's plant. Thus the economies of the Federal Government continuing to look to EPA to develop fuel economy data are substantial and will continue to be substantial.

The success of this program is demonstrated by the public and industry acceptance of our fuel economy data. For example, I am sure the members of this committee have noted that the automobile industry is

currently making extensive use of our fuel economy data as an integral part of its mass media advertising.

On June 26, 1974, the President signed into law the Energy Supply and Environmental Coordination Act of 1974. In part, the act directed the Administrator of the Environmental Protection Agency and the Secretary of the Department of Transportation to jointly conduct a study and report on the practicality of a fuel economy improvement standard of 20 percent for new motor vehicles by 1980. As required by section 10 of the act, the report to the Congress includes an assessment of the technological problems of meeting any such standard, including leadtimes involved, the test procedures required to determine compliance, the economic costs and benefits, the enforcement means, the effect on energy and other resources, and the relationship of safety and emission standards.

In summary, that report, which was submitted on October 24, 1974, concludes that it is clearly practicable to achieve by a variety of means a fuel economy improvement of 20 percent in the 1980 model year fleet compared to 1974 with little further price increase. The full range of potential improvements may be as high as 40 to 60 percent. Simultaneous achievement of the statutory emission standards for hydrocarbons and carbon monoxide with substantial fuel economy improvement is feasible in the new car fleet in 1980.

However, the issue of the level and costs of oxides of nitrogen emissions achievable by 1980 concurrent with substantial fuel economy improvement was unresolved, the report stated. I must also emphasize that the report does not take into consideration the implementation of a sulfates standard in 1979, does not attempt to make a judgment of whether a Federal mandatory fuel economy improvement standard is required, and does not address a possible delay in implementation of the statutory standards beyond model year 1980.

However, we believe that any fuel economy improvement program would be best served if it uses the EPA fuel economy test procedure as a basic measure of this important factor. Even though we readily admit that our test procedure is not perfect, in the sense that no single fuel economy test procedure can ever fully reflect each of the wide variety of driving conditions encountered in actual use, the view that our test procedure is the best available has in recent months gained wide support.

For example, in the recent DOT/EPA report to Congress, the Government technical experts concluded that the EPA test procedure suitably reflects actual driving under city and highway conditions. In recent hearings before the Federal Trade Commission on the subject of fuel economy advertising, the Ford Motor Co., among others, stated that the EPA test procedure is appropriate and should be used as the standard reference for fuel economy. The National Academy of Sciences, in a major report on motor vehicle emissions, also reached the conclusion that the EPA fuel economy data are valid.

This general agreement on the validity of the EPA test procedure for measuring fuel economy, coupled with the fact that use of this procedure provides simultaneous data on the emissions that come from the car's exhaust—a piece of data that would in any case be needed to assure that the car being tested meets emission standards—should

give the committee confidence in establishing the EPA test procedure as the basis for any program.

Mr. Fry and I will be pleased to answer any questions the committee may have.



**Part 1**  
**CLEAN AIR ACT AMENDMENTS—1975**

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**HEARINGS**  
**BEFORE THE**  
**SUBCOMMITTEE ON**  
**HEALTH AND THE ENVIRONMENT**  
**OF THE**  
**COMMITTEE ON**  
**INTERSTATE AND FOREIGN COMMERCE**  
**HOUSE OF REPRESENTATIVES**  
**NINETY-FOURTH CONGRESS**  
**FIRST SESSION**  
**ON**  
**TITLES V AND VI**  
**of**  
**H.R. 2633 and H.R. 2650**  
**(and all other bills which amend the Clean Air Act)**

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MARCH 13, 14, 17, 18, 19, 20, AND 26, 1975

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**Serial No. 94-25**

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Printed for the use of the  
Committee on Interstate and Foreign Commerce





STATEMENT OF HON. RUSSELL E. TRAIN, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY ERIC STORK, DEPUTY ASSISTANT ADMINISTRATOR FOR MOBILE SOURCE AIR POLLUTION CONTROL; ROGER STRELOW, ASSISTANT ADMINISTRATOR FOR AID AND WASTE MANAGEMENT; WILSON TALLEY, ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT; AND ROBERT ZENER, GENERAL COUNCIL

MR. TRAIN. Thank you, Mr. Chairman, Dr. Carter, and members of the subcommittee. I welcome this opportunity to discuss with you our progress in implementing the provisions of the Clean Air Act and to bring to your attention some of the problems that we have encountered in our administration of the act.

As I have stated to you before, we believe the Clean Air Act is one of the most important pieces of legislation conceived by the Congress. Its provisions for shared responsibilities by all levels of government and for participation of citizens in the governmental process for the protection of public health, and improvement in the quality of life are landmark.

Over the course of the last 4 years, we have learned much about the nature and effects of air pollution. We have also learned in our implementation of the act that the needs of our society are ever-changing. Today, I want to share with you some of our experiences.

Mr. Chairman, in your opening remarks you referred to some of your own concerns about the implementation of the act, and they are, of course, concerns which I, as Administrator of the Agency, share.

I think that in some cases the slowness, perhaps, of meeting the full expectations under the act, doubtless are due in some cases to administrative weakness of one kind or another. But I think, more importantly, they probably speak to the overwhelming magnitude of the problems and their complexity.

You referred to some disappointment over the effort of the Agency with respect to the development of alternative automotive power systems, a program which has recently been transferred to the new Energy Research and Development Agency, ERDA, but I would point out—maybe this sounds defensive and I don't mean it defensively—that EPA, I believe, at the largest point in this program, had about \$9 million in appropriated funds available to it for research and development on alternative automotive power systems, and these funds were substantially intended for use as contract funds to smaller independent laboratories around the country as seed money, and I really do not think that the Congress should expect or that the public

should expect that in dealing with a multibillion dollar problem and industry that an agency of government with that kind of resource base should be expected to perform a miracle breakthrough of some kind.

The industry has been spending I presume in the neighborhood of hundreds of millions of dollars a year in the same area. To expect a \$9 million investment on the part of the EPA to be more of a catalyst—although I hesitate today to use the word—I think it is expecting too much, and so I think that these are the kinds of things that the Congress and the administration really has to decide to what extent we really wish to put the resources behind these kinds of activities and to what extent you wish the job to be done by the private sector. The decisions have basically been made that the effort was expected to be conducted by the private sector with some Government stimulus, and this is what we tried to do.

I think we all wish we had gone a lot further but I think that with the funds at hand the Agency really in retrospect did about as much as could be expected and did it quite well.

With respect to the District of Columbia I just want to mention a few things while they are fresh on my mind that you addressed. I think we all read those stories in the Washington papers as to the report that the District of Columbia had the worst air pollution situation in the country, and for the life of us we have been unable to determine the basis for these reports. Our own analysis would show that the District of Columbia does have air pollution problems, particularly with hydrocarbons related to automobiles, but it is far from the dirtiest city in the country. I don't think there is anything to be particularly proud of in terms of the air here, but as compared to Baltimore, New York or a great many other cities, Washington is probably in better shape, and I don't know that this is reassuring to you, but I don't think that the city necessarily deserves top billing that it got in those stories.

Mr. CARNEY. Mr. Chairman, may I interrupt? In my area the pollution is so bad that the paint peels off the houses in the area of the steel corporations, so we don't know what pollution is.

Mr. TRAIN. Mr. Chairman, I had better return to my statement and finish it. Otherwise, I will be inviting dialog and won't finish my own statement.

I appreciate that comment.

Despite the fact that the Nation has been sorely beset with energy and economic difficulties at precisely the time when the financial and other impacts of our air programs were beginning to be felt, the commitment of the American people to environmental progress remains firm. There is every evidence that the public strongly supports our clean air program and will not accept the argument that the Clean Air Act is somehow responsible for any significant share of our energy and economic difficulties. To the extent that other national policies require shifts in our energy and economic priorities, the more imperative it becomes that we not only refuse to relax public health standards and environmental safeguards, but insist even more strongly upon rigorous standards and safeguards.

With respect to the public attitude on these issues, Mr. Chairman, it has certainly been my observation that the public continues to give a very high priority to environmental protection. The most recent

opinion sampling that I am familiar within this regard was the Harris poll that was published on the 3d of March which indicated that an overwhelming majority of those polled across the country did not believe that environmental progress should be turned back in the interests of either energy or economic improvement. They did not feel this was necessary, and I have a copy of the newspaper reports, Mr. Chairman, of that poll and I would suggest putting those in the record, if we may.

Mr. ROGERS. I think it would be well, and without objection that will be done.

[The survey referred to follows:]

[From Philadelphia Inquirer, Mar. 3, 1975]

#### HARRIS SURVEY—MOST SEE ECONOMIC PROBLEMS AS NO EXCUSE FOR POLLUTION

Three out of four Americans are unconvinced that a temporary slowdown of programs on water and air pollution control would "help ease the energy shortage," "get the economy moving again" or "ease unemployment."

Americans rate pollution of water and of air as the nation's third and fourth greatest problems, respectively, U.S. citizens oppose proposals to sacrifice environmental cleanup for either emergency energy programs or for stimulants to the economy.

Large majorities believe that it is possible to rescue the economy and to produce more energy while continuing efforts to control pollution.

Perhaps such public opposition to proposals to curb environmental cleanup is due to a sharp rise of concern about water and air pollution since 1973. This year and in 1973, a cross-section of Americans was asked by the Harris Survey to list problem areas they regard as very serious. The results:

	Percent		
	1975	1973	Change
Inflation.....	83	81	+2
Unemployment.....	74	29	+45
Water pollution.....	51	40	+11
Air pollution.....	46	34	+12
Energy shortage.....	44	27	+17

To determine whether the people believe it necessary to slow down pollution control so as to concentrate more on reducing the energy shortage, the Harris Survey asked a cross-section of 1,543 households recently:

"In order to help ease the energy shortage, do you think it is necessary to slow down the rate at which we clean up air and water pollution, or do you think we can ease the energy shortage and also clean up air and water pollution?"

Total Public Pct.	
Slow down pollution cleanup.....	22
Can do both.....	13
Not sure.....	13

A national majority probably would oppose offshore drilling for oil in the Atlantic, since environmentalists believe that it could pollute the water.

Mr. TRAIN. The Nation can no longer afford to be as dependent on foreign sources of oil or as inefficient in our energy usage as we have been. As to the former, the usage of alternative fuels, such as coal, must be increased as soon as practicable. As a result some facilities will be unable to achieve full compliance with existing State emission limitations by the statutory attainment dates. Mechanisms have been provided in the Energy Supply and Environmental Coordination Act to give additional time for compliance with these limits in appropriate cases of conversion to coal but without in any case authorizing



emissions to exceed the primary air quality standards set to protect health. As to increasing efficiencies in energy usage, increased emphasis must be, and is being given to automobile fuel economy.

The Clean Air Act must take account of these problems. This is not a time to dismantle the act, but rather a time to provide necessary flexibility to deal with the problems at hand and to strengthen the act's basic purposes—clean air for all our citizens at the earliest possible time.

The cornerstone of the act rests on air quality standards. In 1971, EPA set standards to protect the Nation's health and welfare for six major air pollutants: sulfur oxides, particulate matter, nitrogen oxides, hydrocarbons, carbon monoxide, and photochemical oxidants. These standards have been the subject of extensive debate since that time. Both the research community and industries subject to regulation have debated their propriety. I believe we have put these arguments to rest. Our continuing review and the studies undertaken by the National Academy of Sciences on sulfur oxides and on the motor vehicle related pollutants continue to support these standards.

In order to achieve National Ambient Air Quality Standards protective of health, the act requires the States to develop plans designed to meet the standards within 3 years of EPA's approval. Under certain circumstances, extensions of up to 2 years can be granted.

Progress has been made in attaining the standards by the relevant dates. The mean annual average concentrations of sulfur dioxides have decreased by 25 percent and mean annual particulate matter levels have decreased by 15 percent from 1971 to 1974. Problems still exist, however, in urbanized areas particularly with the 24-hour standard for these pollutants. Emissions of automotive-related pollutants are decreasing nationally and can be expected to continue their downward trend as more new cars with emission controls replace older, high polluting models.

Although good progress has been made in reducing ambient particulates concentrations, it is anticipated that approximately 101 of the 247 air quality control regions in the Nation will probably not attain the primary particulate standards by the mandated dates. When I speak of nonattainment, I mean the failure to meet national standards at one or more monitoring sites in an air quality control region. This does not necessarily mean that the air quality throughout the region exceeds the standards. The nonattainment may be caused by "fugitive dust," such as soil from arid lands that become airborne due to the wind, or by urban "background sources," such as street dust raised by wind and traffic, fires, cooking aerosols, and conversion of gaseous pollutants into particulates. An amendment is proposed to provide legal flexibility for the anticipated nonattainment of primary particulate standards, and to provide a revised statutory framework and timetable by which the original goals of the act can be attained.

A similar problem exists with respect to the automotive-related pollutants. We are fairly certain that 10 or more metropolitan areas cannot achieve the primary standards by the mandated dates without severe limitations on automobile use. Our proposed amendment to the act could result in avoidance of extremely harsh control actions, such as gasoline rationing, while insuring that maximum feasible progress will be made toward achieving the primary air standards.

As with particulates, the focus would be on implementing all reasonable measures as rapidly as possible.

My recent decision to suspend, for 1 year, the application of the statutory automobile emission standards for hydrocarbons and carbon monoxide should not be interpreted to mean that the national effort to control automotive-related pollutants should be deemphasized. The suspension decision was based solely on the need to protect public health from the effects of an unforeseen by-product of the technology used by industry to meet the emission standards, sulfuric acid from catalysts. Thus, the need for communities to control transportation sources through all reasonable means remains unchanged and indeed is probably heightened. I want to emphasize that the currently applicable controls on motor vehicles will result in continued reductions in hydrocarbon, carbon monoxide, and nitrogen oxides emissions.

Mr. Chairman, I know that you wish to get into this subject in considerable detail this morning, so since my statement is relatively brief, in an effort to summarize all aspects of the Clean Air Act, I will, at the conclusion of my statement, make some few additional comments about the auto emission suspension decisions which may assist the subcommittee in its questioning of the witnesses. So I will come back to this at the conclusion of my statement, if I may.

Mr. ROGERS. That would be helpful. Thank you.

Mr. TRAIN. Transportation controls are required by the act where automotive-related pollutants have so heavily impacted a community that the Federal motor vehicle emission program will be inadequate to achieve air quality standards by the statutory attainment date and, in some cases, at any time in the foreseeable future. Transportation controls are now required for 27 metropolitan areas. As additional monitoring data becomes available it is clear that more communities will need transportation controls. It should also be emphasized that these controls provide significant by-product benefits in the areas of fuel conservation, relief of traffic congestion, and enhancement of our urban environment. In the area of auto fuel economy, existing transportation control plans in our major cities could reduce the Nation's gasoline consumption by 2 percent.

The transportation controls that have been instituted vary from community to community depending on the magnitude of the problem. In most communities, however, major emphasis is placed on reinforcing the national emission control program for automobiles with vehicle inspection and maintenance programs, vapor recovery at the service pump and improvements in mass transportation. Supplementary control measures include retrofit of older high polluting vehicles, and both carpool programs and the development of parking management programs designed to reduce low occupancy vehicle use.

Under our proposed amendment to the act, communities would be given the time needed, up to a maximum of 5 years, to meet the standards by implementing all reasonable control measures as expeditiously as practicable. Provision is also made for a further extension of time for those communities where the problem is extremely severe.

Let me just add there that we are talking about not across the board extension of compliance dates, but a case-by-case approach to the problem of specific communities where full attainment of ambient air quality standards through the implementation of transportation con-

trol plans are simply unrealistic because involving severe economic or social disruptions as would occur, that is, from a total ban on the use of automobiles in a city such as Los Angeles.

We simply have to have—and I think the Congress should provide—the kind of flexibility that would permit us to extend those compliance dates where required, and for no longer than required. We are not talking about a 5-year extension automatically in given cases, but simply up to as many as each time as is needed. And we, likewise, assure you that even where an extension is provided, that all reasonable measures will be required of the community to go ahead with, such as carpooling, bus lines, and things of this sort, so that it is only the draconian kinds of measures that we are really talking about—where more flexibility is needed.

With a few notable exceptions, the States now have fully enforceable regulations covering stationary source emissions as a part of their approved plans. We estimate that there are over 200,000 sources of air pollution nationwide subject to such regulation. Of this number we believe there are approximately 20,000 major sources accounting for 85 percent of the Nation's air pollution burden from stationary sources. Of the identified major sources, 71 percent are currently known to be meeting emission limitations or are meeting compliance schedule requirements. We expect this percentage to rise to more than 85 percent by the mid-1975 attainment date.

So I would interject here, Mr. Chairman, that while this is no basis for any kind of complacency on the part of the Agency or the Congress, it does show that because of the Clean Air Act an enormous amount of progress has been made in this country in bringing sources of air pollution under progressively tighter control, and I think this is something that this subcommittee in particular should feel very proud of.

We are making very good progress in this regard. We still have a long way to go.

Particular sources, however, in several major industrial categories will not achieve emission limitations by the statutory deadline—notably in the power and steel industries. For the power industry, there has been an inadequate commitment on the part of many companies to implement permanent sulfur oxide controls, for example, stack gas scrubbers or low sulfur coal.

With the increasing cost and other problems of oil and the unavailability of nautral gas for utilities' use, a major control option has been largely foreclosed. The remaining fuel option, low sulfur coal, is in short supply and is projected to continue to be in short supply for at least the next few years.

There are a limited number of vendors who are experienced in installing stack gas scrubbers. It should be noted that this hardware is not a shelf item, but one that must be custom designed for the specific plant, which takes 2 or more years from design to installation of the unit.

Steelmaking industries and others with related operations are experiencing difficulties in meeting regulations due to the complexity of operations and hesitancy on the part of the industry to move rapidly in controlling emissions. We are hopeful, however, of having the industry on compliance schedules by the end of the current fiscal year.



Some of these schedules will necessarily extend beyond the statutory attainment dates.

I think that the recent fairly widely publicized case of the United States Steel open hearth furnace No. 4 in Gary, Ind., is an example of both the problems in achieving compliance, and also the vigorous effort on the part of the Agency to pursue a strong enforcement policy. We have proposed several amendments to deal with these problems. We propose to allow existing powerplants in isolated locations additional time to install permanent controls. Such plants would be required to have permanent controls (principally low sulfur coal or scrubbers) not later than January 1, 1985. Extensions could be granted only if health standards could be fully protected during the interim. Enactment of this amendment would insure that scrubbers are installed first on new plants and plants in urban areas where population exposure is the greatest.

Although we believe that authority exists under the Clean Air Act to write enforcement orders for nonconforming sources extending beyond the statutory attainment date, some contend that our authority is not this broad. In an effort to avoid litigation and to place sources on enforceable compliance schedules at the earliest possible time, we are requesting confirmation of our authority in this area through an amendment applicable to all source categories.

A related amendment deals with the penalty provision for stationary source violations. Under the mobile source control provisions of the act a court can assess a civil penalty for violations. In the stationary source area, only criminal penalties are provided. We are requesting that civil penalties of up to \$25,000 for each day of violation be provided for stationary source violations. We believe the existence of such penalties will significantly add to our enforcement capabilities and will aid in reducing potential noncompliance problems.

We are proposing a number of amendments to the Energy Supply and Environmental Coordination Act (ESECA). Under that act, sources eligible for coal conversion orders must not cause or contribute to a violation of health standards. In addition, sources located in a region where the ambient health standard is being exceeded at some locations, must meet State implementation plan requirements at the time of conversion even though the source does not and would not cause or contribute to the violation. We believe sources should be allowed to convert wherever they may be located as long as the health standard will not as a result be violated.

Another of our proposed amendments to ESECA would allow current coal burning sources to continue using coal even though they are under compliance schedules which require them to switch to oil in the near future to meet Clean Air Act requirements. This amendment would only apply to coal burning sources that do not violate the health standards. In the absence of enactment of this amendment approximately 60,000 barrels per day of oil would need to be used by powerplants that otherwise need not be.

A related proposal would change the ESECA requirement that a source that converts to coal be required to comply with the applicable State emission limitation in effect at the time that the source was ordered to convert since some States are in the process of changing their emission limitations to facilitate the use of higher sulfur fuel.

If a State revises its regulations sources could not take advantage of these new requirements. Also, there may be some cases where State emission regulations are not stringent enough. I believe it is appropriate for converting sources to comply with the State emission limitation in effect at the time the applicable compliance date extension expires. The proposed amendment would effect this change.

Since 1971, EPA has either promulgated or proposed new source performance standards for 24 industrial categories. Such major categories as powerplants, iron and steel mills, refineries, concrete plants, and nonferrous smelters are covered by standards. We are now in the process of examining additional sources of nitrogen oxides and hydrocarbons for possible regulation under this section of the act.

Occasionally there are circumstances where the setting of performance standards are infeasible. For example, it is extremely difficult and costly to measure emissions from petroleum storage tanks. In this case and a few others, the establishment of design or equipment standards is more practicable. Our suggested amendment would confirm our authority to set such standards.

In December of last year, we promulgated regulations designed to prevent the significant deterioration of air quality. These regulations implement a policy which has developed over time involving considerable participation. While the regulations continue to receive judicial scrutiny, we believe that the approach taken is reasonable. It accommodates the competing values involved and is premised on the appropriate role of States and local communities in making key decisions, subject to limited EPA review.

Through the prevention of significant deterioration we are able to protect the environment and to foster better air pollution control planning. Further, the policy adds insurance that certain unregulated pollutants or pollutants which do not currently have a national public health standard are minimized.

We believe the committee should give this matter early consideration. Implementation of a nonsignificant deterioration program should proceed without the uncertainties caused by continuing judicial review or an unclear position within the executive branch or the Congress.

In closing, Mr. Chairman, I want to emphasize the willingness of the Environmental Protection Agency to work with the committee in its deliberations on the act. We believe that the amendments we have suggested to deal with specific problems are sound. We also realize that there may be other ways of accomplishing the same purposes. It is our desire to provide the committee with whatever technical assistance it may need.

At that time I think I will expand briefly, as I indicated, on the subject of auto emission decisions and then, of course, be happy to respond to the committee's questions.

As the committee knows, the current Federal interim standards for auto emissions was set by action of the then Administrator in early 1973. Those standards set the hydrocarbon limit at 1.5 grams per mile, and the carbon monoxide standard at 15 grams per mile, and the nitrogen oxide standard remains at 3.1 grams per mile.

In the Energy Supply and Environmental Coordination Act of last year, the Congress extended those Federal interim standards through the 1976 model year and gave the Administrator of EPA under certain



specified criteria and under certain specified priorities the authority to grant a suspension of the full statutory standards which would otherwise come into effect in the year 1977, or, to state it another way, to provide another extension of the interim standards to 1977 or to set another interim standard of some kind.

We received the first application for a suspension on the 2d of January of this year from one of the U.S. manufacturers. We received subsequent petitions or applications for suspensions from others, including foreign manufacturers, later in the month. We began public hearings as we were required to do in mid-January, and those very extensive public hearings extended through February 19, as I recall.

Now, I personally participated in a number of those hearings, and listened to the testimony of most of the major manufacturers, importers, catalyst manufacturers, public interest groups, and others who were invited or otherwise requested an opportunity to appear. I was required by the statute to make a decision on the suspension application within 60 days of the receipt of the initial application and that 60 days terminated on the 3d of March, and I actually announced my decision on the 5th of March, 2 days late.

But I recite this history to indicate the really very short period of time available to the Administrator making a decision on a highly complex issue following the close of the hearing, and as an opportunity for the technical staff to review a very extensive and very complex technical record.

Following my decision, of course, time had to be available for the development of again a very technical and comprehensive decision document for publications at the time of the decision.

So the time frame has been tight and I am sure that the Congress will want to take, as you are here, a full opportunity to review the issues and the problems involved and to give all elements of the public, industry and public interest groups and others, an opportunity to provide such additional information and details as they may have and let me assure you that we will welcome, and I personally would welcome, any additional information and data that may come to light as a result of your consideration of the issue here.

With regard to automobile emissions generally, I think it is important for you to recognize that with the Federal interim standards now in effect, we have achieved approximately an 83-percent reduction in the level of hydrocarbon and carbon monoxide emissions which existed prior to the institution of the control program, approximately 1969 or 1968 or thereabouts. I mention this just simply to underline generally that this country has been making very substantial progress and it is entirely due in this case to the Clean Air Act in reducing these levels of pollution.

In my decision I granted the suspension petition, and this essentially is all my regulatory authority extended to. As you know, I have made certain suggestions or proposals with respect to the longer term issues keyed to the rationale of my suspension action. The decision on my part was driven, if I can use that word, by the sulfate issue.

Most American automobiles are meeting the Federal interim standards and certainly almost all the California interim standards, which are more stringent, and for the record these are 0.9 and 9.0 for hydrocarbon and carbon monoxide and 20 for nitrogen oxide with use of an oxidation catalyst.

The oxidation catalyst produces sulfates. These sulfates are in the nature of sulfuric acid, making them a subject of even more health concern than other forms of sulfates. All sulfates are a matter of health concern. They are submicron size particles, I think, of point one-tenth of 1 percent. I am not a physicist, Mr. Chairman, or a chemist, so I probably should leave these figures to others, but 0.3 microns, I am told, is the size of these particles.

This was an issue that came to my attention shortly after I became Administrator of the Agency in the autumn of 1973, late September—early October. It was an issue that had been brought to the attention of our scientists in the Agency earlier in 1973, I think in February or so.

Interestingly enough, I am informed that the issue of sulfates never surfaced during the suspension hearings conducted by Administrator Ruckelshaus in 1973, when there was a great deal of discussion of catalysts, both from the standpoint of the automotive industry and also on the part of catalyst manufacturers.

The health issue of sulfates was never, to my knowledge, raised in those hearings and I have discussed this with Bill Ruckelshaus and he tells me that he never had any knowledge of this problem.

In any event, data as to the production of some sulfuric acid by the catalyst was known to the industry some time before 1973, or some elements of the industry. As I understand it, it was not recognized as a problem by them because of such small amounts, and was not at that time communicated to EPA. The information was transmitted to EPA in early 1973 and reached our scientists as a result of a communication from a representative of the Ford Motor Co., as I recall. And I am speaking entirely from hearsay, if I may say, not having been involved in these matters at that time.

During the fall of 1973 there was a considerable discussion within the Agency and much of this surfaced publicly, as you will recall, the nature of the debate over the seriousness of the sulfate issue, so it was certainly not a matter that was unknown to any of us and it was a matter that was discussed by me with the committees of the Congress at the time—I think in November or thereabouts of 1973.

At that time we had preliminary data indicating a cause for some possible concern, but it was very preliminary data. We did not even have full characterizations of the nature of the catalyst emissions at that time. We had very little information on possible health effects.

I, personally, do not recall the point that these sulfate emissions were substantially sulfuric acid, as they now appear to be.

But in any event, the information we had at the time—late in 1973—I would again characterize as indicating some possibility for concern—to be watched closely but not a reason for rolling back the emission program.

As you will recall at that time, the 1975 vehicles were already in certification. The manufacturers already had installed catalysts and designed their cars for the use of catalysts. For us, at the end of 1973, to have decided that there was, based on the information then available, such substantial health risk from sulfates as to require the elimination of catalysts would have, at the same time, required a roll-back in the whole auto emission standards to pre-1975 interim Federal standard levels to at least 1974 with significant implications for



increased emissions of hydrocarbons and carbon monoxide, and for substantially reduced fuel economy.

At that time it seemed to me and to the Congress the better part of wisdom to move ahead on schedule to step up the research program in EPA, to better characterize these emissions and to achieve a better understanding of the potential health hazards, all of which we promptly proceeded to do, and, in fact, had underway early in the year.

I would like to make one comment, that is the EPA did not force the catalyst on the American automotive industry. I think, to be honest, we share—obviously we all share—a responsibility for the situation, but the characterizations I have been reading that EPA is now red faced because it forced the catalyst on the industry I think is totally incorrect and unfair. General Motors began work on catalysts back in 1958 or thereabouts. I think it was in the late 1960's, probably early 1969, that General Motors in California urged the State to develop a no-lead grade of gasoline which would permit the use of catalysts and that the manufacturer would then be in a position to substantially reduce emissions and these same representations were made to the Federal Government and, in due course, the industry, particularly General Motors, and to a lesser extent the other manufacturers, made commitments for the use of catalysts to meet the 1975 standards, whatever they might turn out to be, or the California standards which were more stringent and came into effect earlier.

In the 1973 suspension hearings conducted by Mr. Ruckelshaus, the statute required him, if we were to grant a suspension, to make a finding that effective technology was not available for meeting the statutory standards. He found that the catalyst existed, and was effective in meeting the statutory standards. There was no knowledge, at least on the record, of any sulfate problem, and on the basis of that record, we found in effect that effective technology existed within the meaning of the statute, and having made that finding, he could not have suspended the standards. What he did was to set an interim level which would permit the phasing in of catalysts by the industry, if this was the technology to be used, and the Federal interim standard was set at a level which it was EPA's understanding, would not force the use of catalysts but would establish a level which could be attained, if the industry desired, without the use of catalysts, except for a few model lines.

I sketch this history from what I understand of the situation because I think it is of importance to the Congress to be informed as to what the situation has been.

Now, at the time of the issue coming to a head early this year, at almost the exact time that we go our suspension hearings underway, a very extensive analysis of the sulfate issue as it relates to catalysts was revealed and made public by EPA's own research center in Raleigh—Durham. This is a very extensive analysis which I have available here which I would offer to the committee at this time and would suggest you might wish to make this a part of the record.

Mr. ROGERS. Without objection, it will be made a part of the record. [See "Estimated Public Health—," p. 49, this hearing.]

Mr. TRAIN. This analysis and issue paper came to my attention, I think, as the hearings opened, which was on a Monday, so it was a very

live matter on our minds during the course of the hearings. I scheduled a special 3-day sulfate hearing following the technology related hearing so as to give the manufacturers and the public an opportunity to focus on this particular problem.

To summarize the situation, our own scientists in EPA have concluded that the sulfuric acid mist emissions of catalysts represent a very real health hazard which would come about over a period of time as additional model years of cars come along using catalysts, and the level of sulfate emissions due to higher standards increase. So there seems to be within our own internal scientific community within EPA, particularly among the health scientists, no substantial disagreement that I am aware of that there is a very real health problem involved in the sulfuric acid emissions. This judgment is strongly shared, Mr. Chairman, I might add, by the health scientists of the Department of Health, Education, and Welfare.

The Assistant Secretary of HEW, Dr. Theodore Cooper, addressed a letter to me on this subject a short—well, I would say it was confidential at the time I made my decision and I would be glad to make this a part of the record, if you wish.

Mr. ROGERS. Yes, I think that would be helpful, without objection.

Mr. TRAIN. It is very brief, but it expresses grave concern over the sulfate issue on the part of HEW's health scientists.

[The letter referred to follows:]

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,  
OFFICE OF THE SECRETARY,  
Washington, D.C., February 27, 1975.

HON. RUSSELL E. TRAIN,  
Administrator, U.S. Environmental Protection Agency,  
Washington, D.C.

DEAR MR. TRAIN: I appreciate this opportunity to comment on behalf of the Public Health Service with respect to the issue of the potential health significance of sulfuric acid emissions from the oxidation catalysts being used or to be used in the control of automotive emissions. These comments, it should be noted, do not attempt to address the separate issue of the health effects of the materials contained in the catalysts themselves, as comments on the matter have been provided earlier in other documents.

Assuming that the data and information provided to this Department by the Environmental Protection Agency are in fact correct in respect to the levels of sulfuric acid mist generated or to be generated at the breathing zone level, I am obliged to observe that these catalytic systems pose a significant public health hazard and that the hazard substantially outweighs the potential health benefits based on the projected control of hydrocarbons, nitrogen oxides, and carbon monoxide by the catalytic system.

Admittedly, this is a complex matter and it is possible that a number of additional factors should be considered. Among these are the patterns of motor vehicle use, meteorological conditions, types of catalytic converters employed, and even the possibilities of removal of sulfur from fuel before it is combusted. Of course, we would be interested in reviewing any new information that may be provided and revise our conclusions on such bases.

In conclusion, I must observe that we are deeply disturbed by the information that has been provided to us thus far and continued introduction of the oxidation catalytic converters without effective countervailing measures to control sulfuric acid emissions should be viewed with concern.

Sincerely yours,

THEODORE COOPER, M.D.,  
Acting Assistant Secretary for Health.



Mr. TRAIN. The National Academy of Sciences' recent extensive report on sulfates likewise expresses substantial concern over catalyst-related sulfate emissions. The analysis by our health scientists in Raleigh-Durham of the sulfate problem recognized that while the sulfuric acid emissions of the catalyst pose a health risk, at the same time the catalyst resulted in substantial reductions of carbon monoxide and hydrocarbons, therefore producing a health benefit.

- Those health benefits can be substantially quantified. They are well recognized, well known. The health basis for our hydrocarbon and carbon monoxide standards is well established. The extent of the health risk from sulfuric acid mist and the extent of our knowledge of this problem has not reached that same level of knowledge and certainty. It cannot be so well characterized or quantified, but given the uncertainties, our scientists attempted to arrive at an analysis which would show at what point the buildup of sulfuric acid concentrations from catalysts and the adverse health effects therefrom would outweigh the benefit of continued reduction in carbon monoxide and hydrocarbons. And this effort reached a conclusion, as I recall, that that point would be reached within 2 to 4 years, roughly.

Because of the extreme significance of this conclusion, I had other elements in the Agency from the Office of Planning and Management and from our air programs themselves, examine the methodology being used in arriving at these conclusions, and I don't believe there is any disagreement with the overall conclusions as to adverse health significance of the problem.

It is clear that, given the uncertainties, there is a wide margin of potential error one way or another in trying to arrive at a decision as to whether the problem will exist in 2 or 4 years or whether it exists now or in 10 years.

The best estimate of our health scientists was 2 to 4 years, but I just want you to be aware of an uncertainty with which we are dealing and have had to face. The decision in my lap, so to speak, was whether to—let me back away from that for a moment.

On the basis of the entire record that I had on technology, I made a finding which is in my decision document, that the technology exists in fact to meet the statutory standards in effect for the year 1977 absent a suspension action by me, there is no question of that.

At the same time, I was confronted with the fact that this same technology which was effective in reaching hydrocarbon and carbon monoxide statutory levels was also effective in producing a new health risk, sulfuric acid emissions. It was my decision that we would no longer play a sort of numbers game with this problem and continue to postpone an effort to deal effectively with the sulfate problem. And I concluded that—and this was the basis of my decision—that within the

meaning of the statute a technology which produced a new substantial health problem in achieving hydrocarbon and carbon monoxide standards was not "effective" within the overall meaning of the statute. And this was the basis for granting the suspension.

I was also confronted with the fact that to go to the more stringent California interim standards proposed by the President in his energy message in early January, which was supported by me on the basis of then available information as representing a reasonable balance between air quality on fuel economy and economic concerns, would approximately double the amount of sulfuric acid mist being emitted from the American automobile. This is because to achieve the California standards, we would expect the use of an air pump, that is what is being used in California at the present time, and the use of an air pump introduces additional oxygen into the exhaust stream in front of the catalyst and accelerates the oxidation process and thereby produces the catalyst and it combines with water vapor in the exhaust to form more sulfuric acid.

As you are aware, the sulfuric acid comes from the fact that sulfur exists in gasoline in the feed stocks, and in normal noncatalytic exhaust process the sulfur is simply converted in the automobile combustion process to sulfur dioxide and is emitted as a gas in that form and rapidly moves away. And it may, in fact, in due course, in combining with other things, become sulfates, but not in a concentrated form around the particular highway which is the situation with the catalyst.

With the catalyst, this sulfuric oxide is converted by oxidation in the catalyst and it combines with water vapor in the exhaust to form sulfuric acid. That is a layman's explanation of what happens.

During the 1973 hearings, it was my testimony that sulfate emissions from catalysts could well become a problem in a period of time, and we were, at that point, not in a position to predict when that might occur. But I said we were confident that if it did become a problem, we would, at that point, have other options available to us for controlling the problem. One being desulfurization of fuels, one being the installation of sulfate traps as a further add-on device on the exhaust, and a third being further development and sophistication of the catalyst technology itself.

All of these remain possibilities with various costs and benefits associated with each. None, I am satisfied, represent a natural option for 1977. To desulfurize naturally—and here I think the committee is going to want to take testimony certainly from others on a very complex issue—to desulfurize naturally and have it sufficiently widely distributed, which means everywhere, stock of no lead, low sulfur supply of gasoline, in my understanding, would take upward of 4 years. Perhaps longer.

The figures I gave at my—I think these may be in the decision document and I had them at the press conference when I announced my decision—the possibility of reducing the sulfur content from its present average of 300 parts per million to 100 parts per million would represent a capital outlay cost to oil refiners which was estimated as from \$4 billion to \$6 billion. The actual estimates, I believe, in our hearings ranged from \$1.6 billion to \$10 billion, depending on whose figures you are looking at. And I think it is important to understand that there is a wide range of uncertainty as to these figures.

The best estimate of our own technical people and the one which I used in making my decision was that this would involve about a \$4 billion to \$6 billion cost, and it could not be in place for about 4 years, and would involve an energy penalty at the refining point of about one-half percent of the total 15 million barrels of oil—15 million barrels of oil per day was something on the order of 100,000 barrels—somewhere between 75,000 and 150,000 barrels of oil a day.

But the most important consideration so far as my suspension decision was concerned is that there is no way to get such a desulfurization process in place naturally by 1977 and this is a decision which has to be made now because of the leadtimes involved.

Now, beyond that, I did make certain proposals over a 5-year period because the industry has been asking for a 5-year freeze at current levels. The President has proposed a 5-year at the California interim standards level, and I had indicated at the time the President made his proposals to the Congress that, while I supported those based upon our then knowledge that we were going to have full and extensive hearings, they were going to be objective and independent hearings and that the Agency and myself, as Administrator, at the conclusion of those hearings, would make our recommendations to the President and to the Congress of what we thought the best course of action was on the basis of that record. And this was to be irrespective and not influenced by the President's proposals, and this is what we have done.

We are proposing that a sulfuric acid standard be imposed for the year 1979. It is our technical people's judgment that such a standard could not really be implemented prior to that time.

Someone suggested it might be possible by 1978: I would suspect that would be stretching it, in view of the leadtimes involved. This means, and this is what has led to my suggestion that we hold the Federal interim standard not only for 1977, but also for 1978, and my judgment was that with the introduction of a whole new ball game, so to speak, in 1979 because of the proposal of a sulfuric acid standard, that we hold the interim standard for 1979 as well. Now, there is no way of proving whether this is right or wrong. It is just a matter of judgment at that point. And then to the higher California standards of 0.9 and 9.0 for the remaining 2 years of the 5-year period, 80 and 81.

I also departed from the President's 5-year proposal in the case of nitrogen oxide. The president proposed holding 3.1, the present level, throughout the 5-year period. I have proposed going to the much more stringent level of 2 in 1977, which is where it is under the statute. This is not up to me to suspend in any event, and then holding that for the full 5-year period.

I think that there has been a fair amount of discussion of the desulfurization option. I pointed out one of the estimates which we used. It was the judgment of our people in EPA that a two-thirds reduction in the 300 parts per million of sulfur in gasoline to a 100 parts to the million sulfur in gasoline would really not achieve the kind of reduction of sulfuric acid production from catalysts that our health people are insisting upon.

At the present time, the catalysts meeting the interim standards are producing about 0.03 gram per mile of sulfuric acid. Getting down to 100 parts per million at the Federal statutory standard would



result in a sulfate production of about 0.02 per mile. This is about 20 times the level of the known catalyst car production and while I can't myself make a conclusion at this time on the matter, I do think I can safely say that this represents a much higher level of sulfuric acid mist production than our health people would find acceptable.

Fuel can be desulfurized progressively below the 100 parts per million, and we have, again, various estimates of the economic and energy costs involved in that. To go to 50 parts per million, the estimates—our best estimates at least—are at a range of around \$8 billion to \$12 billion. The energy penalty is probably more in the nature of 1 to 1½ percent rather than half a percent so we are now beginning to talk somewhere between 100,000 and 200,000 barrels of oil a day.

Well, our actual estimates are 210,000 to 250,000 barrels per day. You can further go to 30 parts per million and, obviously, as you would expect, the marginal costs climb very steeply for this kind of refining effort. And here I guess the figures become even more uncertain. You are dealing in a world of the estimate.

The estimate range costwise runs from \$16 billion to \$24 billion and an energy penalty of at least 2 percent and maybe higher. These are considerations which I think the committee would want to take into account in reaching its judgment as to the availability of other options. These may be options that we should be pursuing in due course anyway, but at the present time, in facing the problem of what we do in 1977, I think that unless we are willing to either sweep the sulfate problem under the rug or hold it at arms length somehow, I see no alternative but the decision, unhappy as it is, of keeping the interim standards for this 1977 year, which is what I have ordered.

[Testimony resumes on p. 96.]

[The January 30 and February 1 papers referred to follow:]

#### ISSUE PAPER

##### ESTIMATED PUBLIC HEALTH IMPACTS AS A RESULT OF EQUIPPING LIGHT-DUTY MOTOR VEHICLES WITH OXIDATION CATALYSTS

Office of Research and Development, Office of Air and Waste Management,  
Environmental Protection Agency—January 30, 1975

#### EXECUTIVE SUMMARY

This report is intended to provide a timely update to the three technical papers submitted to the Senate Public Works Committee on January 11, 1974, in support of the Administrator's testimony before that body on November 6, 1973, regarding the impact on public health due to equipping light-duty motor vehicles with oxidation catalysts. The report is based upon extensive data gathered by the Office of Research and Development and the Office of Air and Waste Management as a result of an accelerated and expanded research program mandated by the Administrator. The detailed *technical findings* of these programs have been gathered into a single separate EPA report entitled "Annual Catalyst Research Program Report," dated November 1974.

One problem which complexed the Administrator's decision regarding the use of oxidation catalysts and the related emission of sulfuric acid was the widely different results obtained from the two measurement methods employed by EPA and industry laboratories. One such method indicated high sulfuric acid emissions from catalyst-equipped vehicles and easily measurable levels from non-catalyst vehicles. The other method suggested moderate emission rates of sulfuric acid from catalyst-equipped vehicles and little, if any, from non-catalyst vehicles. This issue has been resolved. Catalyst-equipped light duty motor vehicles do emit significant quantities of sulfuric acid while non-catalyst vehicles have

only trace emissions of this substance. Additionally, we have had the opportunity to determine sulfuric acid emission rates from production 1975 catalyst-equipped vehicles unlike the prototype vehicles in the past. Our studies have shown that we cannot use the Federal Regulated Emissions Test Procedure to obtain representative sulfuric acid emission factors, however. This is due to a sulfate storage phenomenon associated principally with the pelleted catalyst system. Thus, estimated emission factors for sulfuric acid must employ additional driving cycles.

Our emission factor estimate in November 1973 was 0.05 gm/mile sulfuric acid. Current data show that different emission factors are needed to reflect different emission control designs and geographical differences in gasoline sulfur levels. We now estimate that in highway driving, catalyst-equipped vehicles designed to meet the 1975-76 Federal Interim Standards outside California will average 0.03 gm/mile sulfuric acid. Estimates for such vehicles designed to meet either the 1975-76 California Interim Standards or the 1977 statutory standards are 0.05 gm/mile nationally, and 0.08 gm/mile in California. (Gasoline in California contains more sulfur than the national average.)

Estimates of population incremental exposures to sulfuric acid from oxidation catalysts have employed both physical models (CO dispersion, assumed activity models, etc.) and surrogate models (lead, carboxyhemoglobin). As noted in last year's report to Congress, these models show exposure levels which may vary by as much as a factor of two. The physical models have been used in this analysis to generate the 24 hour peak hour exposure level estimates shown in Table 1. It should be noted that the public health benefit-risk analysis (pps. assumed commuter who lives within 150 feet of a major freeway and travels that freeway to and from his job in a large urban center. The peak hour estimates represent projected exposures for persons travelling the freeway described in Table 1. It should be noted that the public health benefit-risk analysis (pps. 35-37) uses exposure estimates for larger urban cities based on the carboxyhemoglobin surrogate method which are independent of assumed human activity patterns.

TABLE 1

[Incremental sulfuric acid peak hourly exposures for a pedestrian near a major arterial thoroughfare and 24-hour average exposures for a commuter living near the expressway for normal and adverse meteorological conditions (Assumptions: CO dispersion model from a 10-lane expressway with 20,000 vehicles per hour at 30-mph average speed.)]

Hydrocarbon/CO emission control scenario <sup>2</sup>	Peak hourly incremental exposure to H <sub>2</sub> SO <sub>4</sub> ( $\mu$ gm/m <sup>3</sup> ) after (yrs)				Incremental 24-hour H <sub>2</sub> SO <sub>4</sub> exposure for urban resident living near expressway (yrs) <sup>1</sup>			
	2	4	7	10	2	4	7	10
Continue 49 State interim standards for 10 years:								
Adverse met.....	52	104	156	208	5.0	10.0	15.0	20.0
Normal met.....	3	6	9	12	.8	1.6	2.4	3.2
Implement California interim standards or statutory standards nationally in 1977:								
Average met.....	52	140	227	315	5.0	13.8	22.6	31.4
Normal met.....	3	8	13	18	.8	2.1	3.4	4.7
California interim or statutory standards in California only:								
Adverse met.....	140	280	420	560	13.0	26.0	40.0	54.0
Normal met.....	8	16	24	32	2.0	4.3	6.4	8.5

<sup>1</sup> Assumes 2 hrs on expressway, 1 hr street canyon or complex source, 13 hours home, 8 hours at work.

<sup>2</sup> Different sulfuric acid emission factors are employed. See table 3 in body of report.

Health effects thresholds for exposures to sulfuric acid have not been well defined. A useful index, however, is the health effects threshold for exposures to ambient suspended particulate sulfates. These data suggest that adverse effects occur in susceptible persons in our population after exposure to 10  $\mu$ g/m<sup>3</sup> suspended sulfates for 24 hrs. or more. Sulfuric acid is believed to be more irritating than the water soluble suspended sulfate material. Short term peak exposure thresholds are not available. However, the literature suggests that healthy young adults exhibit changes in respiratory function after 15 minute exposures to concentrations of 350  $\mu$ gm/m<sup>3</sup> of sulfuric acid. We believe that the 10  $\mu$ g/m<sup>3</sup> for 24 hours exposure represents a level at which people with existing heart and respiratory disorders will be adversely affected. This, of course, provides no margin of safety.



Several options have been considered for the control or reduction of sulfuric acid emissions from oxidation catalyst-equipped vehicles. These fall into two basic classes: limitation of the quantity of sulfuric acid emission from new motor vehicles and limitations on the sulfur content of motor vehicle fuels. No regulatory approach could be expected to have any impact on automotive sulfate emissions before 1977 and then only if regulations requiring reduced fuel sulfur levels based upon fuel blending and allocation are found feasible. Gasoline desulfurization, while technically feasible, cannot be expected to have much impact before 1980. Control of vehicle sulfate emissions through sulfate emission standards or possible shifts by manufacturers to non-catalyst technology would likely not have a significant impact before the 1979 model year.

Other emission products unique to oxidation catalyst-equipped vehicles have been suggested and/or reported. These include hydrogen sulfide ( $H_2S$ ), phosphine ( $PH_3$ ), platinum, palladium, alumina ( $Al_2O_3$ ), nitric acid ( $HNO_3$ ), carbon disulfide ( $CS_2$ ), and carbonyl sulfide ( $COS$ ). Consumer complaints have been received regarding a "rotten-egg" odor from some 1975 catalyst-equipped vehicles. This is likely  $H_2S$ , but could also be  $COS$  or  $CS_2$ . As these compounds are reduced forms of sulfur (while sulfuric acid is an oxidized form), it appears that they (and  $PH_3$ ) are generated during cold start choked operation or in the event of certain types of carburetor malfunction or misadjustment or air pump failure causing the catalyst to lack sufficient oxygen to operate as an oxidizing medium. EPA is investigating this problem in-house, under contract, and with the auto manufacturer. While such emissions appear to occur rarely, it should be noted that  $H_2S$ ,  $COS$ ,  $CS_2$ , and  $PH_3$  are very potent toxic materials if humans are exposed to sufficient concentrations. Nitric acid emissions have been shown to be unaffected by oxidation catalysts. Current production vehicles, unlike some earlier prototypes, apparently do not emit platinum or palladium at levels that can be detected. Emissions of alumina (the catalyst substrate) also appear to be very low.

Related research programs are underway to characterize non-regulated emissions from potential alternative light-duty vehicle power plants. Most emphasis has been focused on diesel engines. The work, to date, suggests that while diesels can easily achieve the statutory HC and CO emission targets, emissions of particulates, sulfur particulate, and organic materials, especially aldehydes, may pose dis-benefits to their widespread use unless such emissions are controlled.

A detailed benefit-risk analysis was performed to estimate the trade-off to public health in using oxidation catalysts by comparing increased sulfur acid exposure dis-benefits to benefits associated with reduced exposures to carbon monoxide and oxidants (unburned hydrocarbons are the key precursors). Although the comparison of health benefits and risks is difficult to precisely quantify, the results of our recent analysis suggest that, if sulfate exposures increase as our models project, the continued use of oxidation catalysts on virtually all new vehicles to reduce hydrocarbon and carbon monoxide emissions would result in a net public health risk from increased sulfate exposure after 4 model years. It should be noted however, that this conclusion is based upon assumptions about dose responses and human exposure about which there still remain uncertainties.

#### INTRODUCTION

In mid-1972, EPA research groups voiced concern about the potential for hazardous non-regulated emission products from oxidation catalysts planned for use on 1975 model year light-duty motor vehicles. Data from a number of sources began surfacing in early 1973, which suggested that sulfuric acid, platinum and palladium were emitted from such systems. As more data became available and the EPA laboratories in both Ann Arbor and Research Triangle Park intensified their investigations, it became apparent that sulfuric acid was indeed emitted from oxidation catalysts. The issue quickly focused upon the potential public health impact of such emissions, while the time available to make any decision regarding the use of the devices was rapidly diminishing. The Senate Public Works Committee held hearings addressing the issue specifically on November 5 and 6, 1973.

In testimony before the Senate on November 6th, the Administrator voiced his decision not to interfere with planned use of oxidation catalysts on 1975 model year vehicles. In addition, he mandated an accelerated and expanded EPA research program to attack four primary issues:

- (1) Accelerate work on development of a reliable test procedure for automotive sulfate emission measurement.



(2) Consider all feasible alternatives for automotive sulfate emission control.  
 (3) Improve the Agency's ability to estimate the public health impact of sulfate and other automotive emissions.

(4) Improve understanding of the atmospheric chemistry involved in these emissions and initiate an appropriate air monitoring program.

This broad, interdisciplinary research program has been initiated. It is being conducted in close cooperation by both the Office of Research and Development and the Office of Air and Waste Management. The detailed technical results of the effort have been prepared in a single, separate report entitled "Annual Catalyst Research Program Report" dated November 1974, which is currently being circulated within the Agency in draft form for comments and review.

This report draws upon the technical report for information, but is not intended to be a technical report in itself. Rather, it is intended to put the issue of the future use of oxidation catalysts on motor vehicles in a perspective of public health benefits and risks and to suggest what impact decisions related to future emissions standards will have thereon. The specific topics covered are those which influenced the decision regarding catalysts in late 1973 and, with a greatly expanded research information base, attempts to project future impacts. It must, however, be noted that most of the research programs were only initiated in mid-1974 and are not now completed. On balance though, we feel that a much better defined basis currently exists to assess these complex issues than was available last year at this time.

#### EMISSION FACTORS

At the time EPA was preparing testimony for the Senate in November 1973, regarding catalyst-generated sulfuric acid, two rather different approaches were being used to ascertain the emission levels of sulfuric acid by both EPA and industry. One, an adaption of a stationary source  $\text{SO}_2/\text{SO}_3$  method (referred to as Method 8) was principally used by the EPA laboratory in Ann Arbor and by Chrysler Corporation. Data obtained by this method indicated that substantial sulfuric acid was emitted by non-catalyst vehicles while catalyst-equipped vehicles emitted higher levels. The other method, used in minor variations of design, was an exhaust air-diluted particulate technique pioneered by Habibi of DuPont. This method indicated that little or no sulfuric acid was emitted by non-catalyst vehicles but that easily measurable quantities were emitted by oxidation catalyst-equipped vehicles. Extensive research has shown that the air-dilution method is correct, while Method 8 generated artifact sulfate. At the time the Administrator made his decision regarding the use of catalysts on 1975 vehicles, it was not known which method was correct.

The emission rate of sulfuric acid from oxidation catalyst-equipped vehicles, while clearly established, has been somewhat more difficult to quantify. Sulfuric acid emissions are dependent upon at least the following variables: vehicle cycle, fuel sulfur level, catalyst type, degree of HC/CO control desired (75 National Interim Standards vs 75 California Interim Standards vs Statutory Standards), fuel economy, catalyst preconditioning, catalyst age, catalyst operating temperature, exhaust oxygen content, and catalyst space velocity.

#### *Vehicle Cycle*

The relationship of automotive-generated pollutants to achieving Air Quality Standards is generally predicted using the Federal Test Procedure (FTP) for motor vehicle emissions. This procedure employs cold and hot start cyclic tests separated by a 10-minute hot soak for a total of 41 minutes. Mass emission rates are determined for the complete cycle for the pollutants which are regulated. Obviously, this test procedure was run to determine sulfuric acid emission rates from catalyst-equipped vehicles. In addition, various cruise modes were operated to better elucidate the sulfuric acid emission rates from catalyst-equipped vehicles. It was found that the mass emission rate of sulfuric acid was substantially different for cold start, hot start, cyclic, and cruise operating modes. In addition, the two basic catalyst systems (monolithic and pelleted) were dramatically different in their sulfuric acid emission characteristics.

Further investigation was undertaken to better identify the cycle dependence of the sulfuric acid emission rate. These studies have established that the pelleted catalyst system is a low emitter of sulfuric acid under conditions of the cold-start Federal Test Procedure while it is similar to the monolithic systems under cruise conditions. Further investigation has clearly shown that the pelleted

catalyst stores sulfur compounds under cold-start conditions and releases them as sulfuric acid and  $\text{SO}_2$  gas at higher temperatures associated with cruise modes. Ford has also conducted fairly extensive studies which showed little storage in monolithic catalyst but significant storage in pelleted catalysts, particularly when new.

It now appears certain that the Federal Test Procedure cannot be solely used to obtain sulfuric acid emission factors. Most EPA research, both in-house and under contract, has focused in recent months upon development of a representative cycle to properly reflect real world sulfuric acid emission rates. A combination of the Federal Test Procedure, the Highway Fuel Economy Test Procedure, and Highway Cruise Modes appears needed to properly assess sulfuric acid emission rates for air quality projections.

#### Fuel Sulfur Level

Sulfuric acid emissions from oxidation catalysts result from the oxidation of  $\text{SO}_2$  gas which is emitted from the combustion chamber of the engine as a result of the burning of sulfur compounds in the fuel. The average gasoline in the U.S. contains 0.03 weight % sulfur while Southern California gasoline contains 0.05 to 0.07 weight % sulfur. Table 2 presents representative data relating sulfuric acid emissions to fuel sulfur levels.

TABLE 2.—EFFECT OF FUEL SULFUR LEVEL ON SULFURIC ACID EMISSIONS FROM OXIDATION CATALYST-EQUIPPED VEHICLES

	Cycle	Catalyst type	$\text{H}_2\text{SO}_4$ , gms/ mile
Fuel sulfur weight percent:			
.019	40 mph	Monolithic	0.019
	Cruise	Pelleted	.002
.091	40 mph	Monolithic	.12
	Cruise	Pelleted	.126
.110	40 mph	Monolithic	.163
	Cruise	Pelleted	.168
.019	FTP	Monolithic	.009
.032	FTP	do.	.014
.057	FTP	do.	.019
.082	FTP	do.	.023
.107	FTP	do.	.029

Clearly, and not unexpectedly, sulfuric acid emission rates increase with increasing sulfur levels in the fuel. Some debate exists as to whether such increases are linear with fuel sulfur level, however, for all catalyst systems. It is normally assumed, and is in this report, that fuel sulfur level and sulfuric acid emission rates are linearly related. It is essential, therefore, to establish the fuel sulfur level of gasoline in estimating sulfuric acid emission factors and the related exposure estimates. We have assumed 0.03 weight % for the nation with the exception of Southern California where 0.05 weight % sulfur has been assumed.

#### HC/CO Control Level

The 1975-76 Interim Emissions Standards provide two emissions targets for the auto manufacturer: reasonably stringent California standards which almost all manufacturers have met utilizing air-injected oxidation catalyst technology, and less stringent national standards which have resulted in a majority of the manufacturers employing catalysts, in many cases without air-injection. The oxidation catalyst is a device which requires excess oxygen in the oxidation of HC and CO. The message is quite simple—to achieve greater oxidation (lower levels of HC and CO) provide more excess oxygen. All data available indicates that increasing the excess oxygen (through air-injection) available to the catalyst increases sulfuric acid emission rates. Data reported by GM suggest that doubling the oxygen level doubles the sulfuric acid emission rate. Therefore, quite apart from the fuel sulfur level factors discussed earlier, we can expect California Interim Standard and Statutory Standard vehicles to emit greater quantities of sulfuric acid. Should non-air-injection catalyst approaches be employed to achieve future emission standards, however, the emission of sulfuric acid would likely be substantially reduced. Non-catalyst-equipped vehicles, on the other hand, do not show changes in sulfuric acid emissions with increasing exhaust content (air injection).



### *Fuel Economy*

Sulfuric acid emissions are directly related to the amount of sulfur dioxide ( $\text{SO}_2$ ) passing over the catalyst per mile driven, all other factors held constant. Thus, any shift toward a higher catalyst-equipped vehicle population average fuel economy would proportionally reduce the emission factor for sulfuric acid from such vehicles. Efforts to, in essence, drive the catalyst harder by air-injecting and exhaust a dirtier product from the engine to the catalyst in order to optimize engine fuel economy and driveability would not likely provide such a benefit, however. The major benefit would accrue from a shift to a lower average vehicle weight and lower aerodynamic drag.

### *Catalyst Pre-Conditioning*

Pre-conditioning factors are important in ascertaining reliable sulfuric acid emission rates from some catalysts. When pelleted catalysts are used, significant sulfur storage occurs as discussed earlier. Often, when testing new pelleted catalysts, no sulfuric acid emissions are measured. This is likely due to the capability of the large amount of catalyst substrate (5-7 pounds) to store large quantities of sulfur compounds until saturated. The same storage capability, even with high mileage pelleted catalysts, makes it essential that we know the immediate pre-history of the vehicle before testing. For example, very different sulfuric acid emission rates would be obtained if the vehicle had experienced several repetitive FTP tests as compared to a long high speed cruise. These factors appear to be much less important when testing monolithic catalysts.

### *Catalyst Age*

In general, most current data indicates a trend for more rapid increases in regulated emissions during early mileage accumulation and a less rapid increase with higher mileages. It thus appears that catalyst deterioration is more severe during the first miles than the later ones. One would expect that as the catalyst's efficiency in converting HC and CO decreased, so would its efficiency in converting  $\text{SO}_2$  to sulfuric acid. While only limited experimentation has been done on this subject, it tends to confirm this anticipation. Work conducted under contract to our Ann Arbor laboratories suggest on the order of a 25% decrease in sulfuric acid emission rate with a high mileage catalyst. Such factors are not, however, sufficiently quantified and have not been used in exposure estimates and emission factor calculations.

### *Catalyst Operating Temperature*

In theory, catalyst temperature would be expected to have a significant effect on sulfuric acid formation from  $\text{SO}_2$ . Thermodynamically, one would expect decreased conversion to sulfate as catalyst temperature increased assuming the oxygen content was held constant. Indeed, one tends to see such effects with monolithic catalysts, principally in bench-scale tests. Similar data from pelleted catalysts is simply not available due to the overwhelming effect of sulfur storage. In addition one typically calculates sulfur conversion percentages of 30% for catalysts operating in cruise modes while the theoretical conversion efficiency is over twice that percentage.

Unfortunately, automotive catalysts operate most of the time at temperatures where sulfur conversion is theoretically quite efficient. Substantially lower operating temperatures would result in less efficient HC/CO conversion and much higher temperatures would result in catalyst durability problems.

### *Space Velocity*

It would be expected that the rate of exhaust product flowing across the catalyst would have an effect on sulfur conversion efficiency due to reaction kinetics effects due principally to a limitation of the reactant residence time in the catalyst chamber. Only GM has reported results of such studies which indicated a 4% decrease in sulfuric acid formation with a 4-fold increase in space velocity. The effect of space velocity therefore, appears to be a very minor one.

### *Emission Factors*

The many factors which influence the emissions of sulfuric acid from catalyst-equipped light duty motor vehicles have been reviewed. Most of the data and results discussed have been obtained using prototype vehicles. Only very recent and limited data was available to us from actual 1975 production vehicles tailored to achieve the Federal and California Interim Standards. It is apparent from

the foregoing that those parameters most important in determining catalyst sulfuric acid emission factors are fuel sulfur level, vehicle cycle, catalyst type, and the HC/CO emission standard. Our ability to quantify the effects of these factors is best for the first parameter and becomes progressively poorer.

Based upon the information available to us at the present time, researchers in the Office of Research and Development and the Office of Air and Waste Management concur with the following sulfuric acid emission factors (Table 3).

TABLE 3.—SULFURIC ACID EMISSIONS FACTORS FOR 1975 AND SUBSEQUENT MODEL YEAR LIGHT-DUTY MOTOR VEHICLES

[Assumes 100 percent catalyst usage in California 1975-76 and nationally 1977-86]

Vehicle model year:	Fuel sulfur (percent)	HC/CO emission standard	H <sub>2</sub> SO <sub>4</sub> emission factor (gms/mile)				
			FTP	HFET	Cruise (mph)		
					30	40	60
1975-76.....	0.03	Federal interim (49 States).....	0.01	0.03	0.03	0.03	0.04
1975-76.....	.05	California interim.....	.025	.08	.12	.11	.09
1977-86.....	.03	Statutory.....	.02	.05	.07	.07	.06

Note: California interim and statutory emission standard catalyst-equipped vehicles are assumed to use air injection. FTP—Federal test procedure (regulated emissions). HFET—EPA highway fuel economy test.

These emissions factors take into account fuel sulfur levels, percentage of 1975-1976 vehicles equipped with catalysts, the percentage of vehicles equipped with a catalyst on one-half the exhaust systems (75-76), and the percentage of vehicles equipped with pelleted (40%) and monolithic (60%) catalysts. The 1975 National Interim Standards average fuel economy is assumed for each model year. Application of these emission factors to exposure estimates will be discussed in a subsequent section of this report.

#### EXPOSURE ESTIMATES

Estimates of incremental sulfuric acid exposures as a result of the use of oxidation catalysts have employed both physical models, (such as carbon monoxide dispersion) and surrogate models (such as carbon monoxide, carboxyhemoglobin and lead). For purposes of this review *only* physical models will be employed. A number of basic assumptions are made: (1) sulfuric acid aerosols disperse like a stable gas and (2) sulfuric acid emission factors are as shown in the previous Table 3 for the conditions specified. Typical and adverse meteorological conditions are examined and projections of peak hour and 24-hour average exposures are made based upon the vehicular source, vehicular traffic flow, vehicular average speed, and meteorological conditions specified for such exposure estimates. Estimates are shown for a single major expressway, intersecting expressways, a street canyon, and a complex source typified by a sports complex.

For selected cases, estimates for incremental catalyst generated sulfuric acid exposures are made for the work place and at home for an urban resident living near a major arterial thoroughway and working in the downtown urban area. From such exposure estimates and an assumed activity pattern, 24-hour incremental catalyst generated sulfuric acid exposures are estimated.

#### CO DISPERSION MODEL—PEAK HOURLY EXPOSURES

Table 4 provides tabulated peak hourly incremental sulfuric acid exposures based upon various emission scenarios for selected receptors for a single, major arterial thoroughway, two intersecting major arterial thoroughways, a street canyon, and a complex source typified by a sporting event. The major arterial thoroughway assumed is that used in the January 11, 1974 paper, "Estimated Changes in Human Exposure to Suspended Sulfate Attributable to Equipping Light Duty Motor Vehicles with Oxidation Catalysts." It is a heavily travelled 10-lane expressway with a daily flow of 233,000 vehicles and a peak flow of 20,000 vehicles per hour. (J. F. Kennedy in Chicago carries 267,000 vehicles per day and the Santa Monica Freeway in Los Angeles carries 226,000). The intersecting freeways are assumed to be 8 lanes, each with 2,000 vehicles per hour for

4 lanes each and 1,000 vehicles per hour for each of the other 4 lanes. Adverse meteorological conditions, E stability (slightly stable), and 1M per second wind velocity are assumed. The expressway street canyon employs an 8 lane expressway with 2,000 vehicles/lane/hour in 4 lanes and 1,000 vehicles/lane/hour in the other 4 lanes.

Vertical-walled, flat-topped buildings with a 2 M per second wind at 90° are assumed. The sporting event used to project a complex source exposure assumes a parking area and sport center 600 M by 700 M adjacent to two intersecting 4 lane streets. The parking lot is assumed to contain 3,000 vehicles which exit via 3 exit roads onto the two 4 lane streets in one hour. These vehicles are imposed upon a flow of 100 vehicles/lane/hours on the two 4-lane streets. Light winds (1 M/Sec.), neutral (D) stability, and a 1,000 M mixing height are assumed. In all cases except the complex source, sulfuric acid emission factors based on the highway fuel economy cycle are used. For traffic inside the sports complex, the Federal Test Procedure is considered more representative.

The above exposure estimates are, as noted, based upon dispersion model estimates for localized concentrations. Perhaps a more meaningful exposure assessment is the assumed activity model estimate presented in the above referenced January 11, 1974, paper. This model assumes that a commuter spends two hours daily on busy arterial thoroughfares, one hour in a street canyon or complex source, thirteen hours at home, and eight hours at work. Based upon the model parameters presented in that paper, the following exposure projections (Table 5) were prepared assuming sulfuric acid emissions factors represented by the Highway Fuel Economy Test Procedure.

While these projections must make assumptions regarding meteorological conditions, vehicle driving patterns, vehicle densities, and human activities, there does exist a limited amount of data gathered on and near real-world roadways that have been tabulated in Table 6. Sulfuric acid exposures are projected based upon the CO-sulfuric acid emission factor relationship. This, of course, assumes no CO contribution from any but automotive sources. This is likely a reasonable estimate in many of the study cases. Additionally, CO and SO<sub>2</sub> surrogates based upon the Los Angeles Catalyst Program Freeway Sampling Station are included. These values are corrected for background, contributed by off-roadway sources.

It is evident that California vehicles emit greater amounts of sulfuric acid and the resultant exposures are, therefore, higher. This, in part, is due to the fact that Southern California gasoline contains more sulfur than the national average gasoline (Table 3). Should California gasolines be reduced in sulfur content to national averages, the emission factors for the 1975/76 California Interim Standards would be the same as the National Statutory Standards Emission factors. A comparison of exposures resulting from maintenance of the National Interim Standard through the 1981 model year versus a movement to the statutory HC/CO standards for the 1977 model year indicates that sulfuric acid exposures would be increased about 50% over the levels associated with the continuance of the National Interim Standards if catalysts are continued in use without efforts to reduce sulfuric acid emissions. We would expect no difference in sulfuric acid emissions from vehicles on a national basis whether at the California Interim Standard or the Statutory HC/CO Standard.



TABLE 5.—PREDICTED 24-HOUR INCREMENTAL EXPOSURES TO SULFURIC ACID EMITTED FROM CATALYST-EQUIPPED VEHICLES ASSUMING SPECIFIED HUMAN ACTIVITY MODEL FOR AN URBAN RESIDENT

Assumed receptor*	Sulfuric acid emission factor**	Incremental 24-hour sulfuric acid exposure in $\mu\text{gm}/\text{m}^3$							
		2 model years		4 model years		7 model years		10 model years	
		Normal met.	Adverse met.	Normal met.	Adverse met.	Normal met.	Adverse met.	Normal met.	Adverse met.
Commuter living near arterial thoroughway	0.03 (49 State)----- .08 (California)----- .05 (Stat)-----	0.8 2 .8	5.0 13.0 5.0	1.6 4.3 2.1	10.0 26.0 13.8	2.4 6.4 3.4	15.0 40.0 22.6	3.2 8.5 4.7	20.0 54.0 31.4
Commuter living away from arterial thoroughway	.03 (49 State)----- .08 (California)----- .05 (Stat)-----	.6 1.6 .6	4.0 10.7 4.0	1.2 3.0 1.6	8.0 21.0 10.7	1.8 4.8 2.6	12.0 32.0 17.4	2.4 7.0 3.6	16.0 43.0 24.0

\*Assumes 2 hours on expressway, 1 hour street canyon or complex source, 13 hours at home, and 8 hours at work.

\*\*Assume table 3 emission factors. 49 State equals 1975-76 national interim standards, California equals 1975-76 California interim standards, and Stat equals statutory HC/CO standards, Stat. assumes 49 State interim for years 1975-76.



TABLE 6.—CARBON MONOXIDE-SULFURIC ACID EMISSION BASED UPON REPORTED ROADWAY SAMPLING STUDIES, 4 YEARS OF CATALYST-EQUIPPED CARS ASSUMED (50% VMF) USING HIGH-WAY FUEL ECONOMY EMISSION FACTORS AND FOR 2 EMISSION SCENARIOS 1975-79 AT 49 STATE INTERIM/1975-76—49 STATE 1977-78 STATUTORY

Road type/name	Maximum vehicles per hour	Average vehicles per day	Average speed (miles per hour)	Assumed CO emission factor (gm/mile)	Assumed sulfuric acid emission factor (gm/M) <sup>1</sup>	Equivalent sulfuric acid exposure, $\mu\text{gm}/\text{M}^3$			Remarks
						Maximum per hour	24-hour average	Other	
New York City, Transmanhattan expressway, New York City, 12 lanes, West 40th St., New York City, 3 lanes,....	14,200	160,000	46	21	.03/.04	88/117	21/27	9.8/18 maximum hour, 2/3 24-hr. average, 3rd floor outside.	Air rights building. Street canyon.
City street, 4 lanes.....	1,500	28,000	16	75	.03/.04	14/18.7	3.6/4.8	2/3 24-hr. average sidewalk.	
Viaduct street, 6 lanes.....	7,600	108,000	38	26	.03/.04	16/22	6/7.6	4/5 24-hr. any sidewalk.	
At grade, 8 lanes.....	4,700	55,000	48	21	.03/.04	27/35	6/8.3	4/5 24-hr. any sidewalk.	
Shallow cut, 6 lanes.....	6,400	107,000	38	26	.03/.04	76/101	18/24		
Deep cut, 6 lanes.....	7,000	118,000	48	21	.03/.04	56/74	14/19		
Double cantilever, 6 lanes.....	12,000	100,000	45	22	.03/.04	33/44	12/16		
Los Angeles, catalyst freeway site.....		~170,000		21	(California HFET emission factor)	30.4	5	6-month average, 16 monthly average—maximum hour of day, 12 24-hr. maximum based upon SO <sub>2</sub> .	

<sup>1</sup> Values shown represent 4 catalyst model years for 2 hydrocarbon/CO emission control scenarios; i.e., 4 years at 49 State interim standards/2 years 49 State then 2 years statutory.  
<sup>2</sup> 2 years at 49 State (0.03) and 2 years at statutory (0.05)=0.04 average H<sub>2</sub>SO<sub>4</sub> emission factor. (Ref. table 3).

## OTHER NON-REGULATED EMISSIONS

The issue of sulfuric acid emissions from oxidation catalysts has triggered a far more sophisticated concern for the non-regulated emissions issue than was evident even in the fairly recent past. While such emissions from catalyst systems has, of course, been the principal focus such studies have been expanded in the area of potential alternate power plants to the current gasoline reciprocating engine. Emissions of platinum, palladium, alumina, carbon di-sulfide, hydrogen sulfide, phosphine, and carbonyl sulfide have been reported or strongly suspected from various catalyst systems. Of greater past research interest has been the emissions of particulates lead polynuclear aromatic hydrocarbons, aldehydes, and phenols.

Platinum, palladium, and alumina (catalyst support material) were identified by a few laboratories in exhaust particulate from earlier prototype catalysts. While slight increases in alumina are seen with current production systems, the emissions of platinum and palladium are at least below detectable limits.

Hydrogen sulfide and phosphine have been identified in the exhaust from oxidation catalyst-equipped vehicles. As these are reduced species, they are apparently formed when insufficient oxygen is present in the exhaust passing the catalyst. This can occur in catalyst-equipped vehicles, primarily certain 49-State Interim Standard Vehicles which do not use air injection when the vehicle is started cold and operating under choked conditions. It could also occur in some vehicles if the air injection pump fails. The principal concern has been hydrogen sulfide emissions due primarily to its disagreeable odor which is easily detected at very low concentrations. As a result of related consumer complaints, EPA requested information of this subject from the auto manufacturers on November 7, 1974. Responses varied, but none indicated surprise that under certain conditions hydrogen sulfide would be exhausted. Corrective action usually involved carburetor or air pump adjustments.

The most extensive response was from Toyota who had initiated an odor study in 1973 during their catalyst development program. Their research suggests the possibility that the odor is not uniquely hydrogen sulfide which is consistent with some of the ORD emissions research personnel's suggestion of carbon disulfide and/or carbonyl sulfide. Current data suggests that reduced species probably odorous, are likely from some catalyst-equipped vehicles under certain operating conditions. Our research regarding such emissions is underway and progressing. Fortunately, most of these compounds can be detected via their odor at concentrations well below dangerous levels. However, all are highly toxic in sufficient concentrations. Reported emissions rates of hydrogen sulfide (40 ppm maximum) and phosphine (1 ppm) are low enough that exposures to levels sufficient to insure adverse health effects is not likely except, potentially, in highly confined spaces in which case carbon monoxide levels would also pose a health threat.

Substantial decreases in the emissions of lead, particulate, polynuclear aromatic hydrocarbons, phenols, and aldehydes are achieved with oxidation catalysts. These provide public health benefits.

Emissions of non-regulated pollutants from diesel powered passenger vehicles has recently begun to receive increased attention. Preliminary data from EPA programs suggests that certain non-regulated emissions from diesels should be viewed in the context of the catalyst-generated non-regulated emissions which have been of principal concern herein. In summary, diesel powered cars have low regulated emissions and good fuel economy. However, aldehyde emissions are significantly higher than previously thought due to an analytical method interference.  $\text{NO}_2$  makes up a significant fraction of the total  $\text{NO}_x$ , particulate emissions are high (mainly elemental carbon) and sulfate particulate emissions may approach the levels of those associated with some catalyst-equipped vehicles.

It was noted earlier that substantial decreases in lead emissions occur when catalysts are employed. This is because lead (and phosphorus) poisons such devices and EPA has required the availability and use of an unleaded fuel grade for vehicles so equipped. However, should the energy crisis deepen and/or catalyst-equipped vehicles require higher than the minimum 91 octane fuel required by EPA, it is likely that substitute antiknock compounds will be used.

Should these be metal-containing, the potential exists for yet another unregulated emission product from our future light duty vehicles.

## HEALTH EFFECTS

## PARTICULATE SULFATES AND SULFURIC ACID

While significant progress has been made in control of sulfur dioxide ( $\text{SO}_2$ ) emissions, recent health studies suggest that the degradation products of  $\text{SO}_2$ , namely sulfuric acid aerosols and particulate sulfates which are formed in the atmosphere, may be more potent irritants than  $\text{SO}_2$  itself. Animal studies have shown that sulfuric acid and sulfate compounds were much more potent irritants than  $\text{SO}_2$  gas alone. Additionally, these studies suggest that the mass weight of sulfates is an insufficient basis upon which to predict irritant potency; particulate size, chemical composition, and temperature determine the toxic potential of particulate sulfates. Effect on the respiratory system in animals has been observed at sulfuric acid concentrations of  $30 \mu\text{gm}/\text{M}^3$ . Healthy human volunteers exhibited rapid increases in respiratory rate when exposed for even short durations (15 minutes) to sulfuric acid aerosol concentrations of 350 to  $500 \mu\text{gm}/\text{M}^3$  and immediate irritation of the throat and nose at concentrations of  $1100 \mu\text{gm}/\text{M}^3$ .  $\text{SO}_2$ , on the other hand, will not cause such symptoms in most humans even at concentrations exceeding  $10,000 \mu\text{gm}/\text{M}^3$ .

More recent reports based upon epidemiological studies carried out as part of the EPA Community Health and Environmental Surveillance System (CHESS) indicate that adverse health effects in communities may be more closely associated with exposures to suspended particulate sulfate than to other pollutants. A monograph summarizing the results of CHESS studies in New York City, Utah, and Chicago was published in June 1974. A second series of individual research reports summarizing results from the eastern U.S. and an additional year's effort in the New York metropolitan area is being prepared as a second monograph. In general, these studies confirm the adverse effects of air pollution and particulate sulfates previously reported.

The health parameters in the studies reported are chronic respiratory disease, lower respiratory disease, pulmonary function, acute respiratory disease, irritation of asthmatics, and irritation of symptoms reported by the general population during an acute air pollution episode. From these and other studies, the following best judgment threshold concentrations for selected adverse health effects due to suspended sulfate particulate exposures are projected (Table 7).

TABLE 7

Threshold Concentrations of Suspended Sulfate Particulate Exposures for Selected Adverse Health Effects (Best Judgment).

<i>Adverse Health Effect</i>	<i>Threshold Concentration of Suspended Sulfates and Expose Duration</i>
Increased Daily Mortality-----	$25 \mu\text{gm}/\text{M}^3$ for 24 hrs. or longer.
Aggravation of Heart and Lung Disease in the Elderly.	$9 \mu\text{gm}/\text{M}^3$ for 24 hrs. or longer.
Aggravation of Asthma-----	$6-10 \mu\text{gm}/\text{M}^3$ for 24 hrs. or longer.
Excess Acute Lower Respiratory Disease in Children.	$13 \mu\text{gm}/\text{M}^3$ for several years.
Excess Risk for Chronic Bronchitis (non-smokers).	$10 \mu\text{gm}/\text{M}^3$ for up to 10 years.

## PLATINUM AND PALLADIUM

The reported health effects studies, limited as they may be, have focused upon human health effects due to exposures to soluble platinum compounds. Such exposures occur principally in platinum refineries, for which a TLV (threshold limit value for occupational exposure) of  $2 \mu\text{gm}/\text{M}^3$  has been established. Inhalation exposures to this material, and other soluble salts of platinum, are reported to result in "platinosis," a disease the symptoms of which are similar to asthma. Exposures to insoluble platinum salts or the metal are generally considered to be safe, although only extremely limited work in this area has been conducted. Related studies of palladium are essentially nonexistent.

A substantial toxicological research program focusing on platinum and palladium was initiated by EPA in early 1974 following preliminary data from a number of laboratories which indicated that these metals were emitted from prototype catalysts. Preliminary results from these studies suggest the following:

1. Platinum, as a soluble salt, is a potent sensitizer and is highly allergenic.



2. The population susceptible to platinum allergy is unknown.
3. Platinum and palladium can be adsorbed into biological tissues of animals by various exposure routes.
4. Soluble platinum compounds are more toxic than lead when administered orally while palladium is more so when administered intravenously.
5. Palladium apparently acts as a nonspecific cardiac irritant as well as a peripheral vasoconstrictor in animals.

We have not, however, been able to detect platinum or palladium emissions from production catalysts or to identify their compounds emitted from earlier devices. Platinum has been shown to methylate, however, in preliminary studies. We are determining the stability of such compounds at the present time.

While we do not now believe that platinum or palladium pose a general emission-inhalation exposure potential, the longer term potential risks associated with large scale introduction of these metals into general use cannot now be assessed.

#### HYDROGEN SULFIDE, PHOSPHINE, CARBON DI-SULFIDE, AND CARBONYL SULFIDE

Hydrogen sulfide and phosphine have been identified in catalyst-equipped vehicle exhausts. Carbon di-sulfide and carbonyl sulfide have been suggested but not identified although they have been seen in experimental reduction catalyst studies.

Hydrogen sulfide in high concentrations (500-1000 ppm) acts primarily as a systemic poison causing unconsciousness and death through respiratory paralysis. At lower concentrations it acts as a respiratory irritant (50-500 ppm), while at low concentrations it affects the eyes (5-20 ppm). Low concentration effects also include nervousness, coughs, nausea, headache, and insomnia. It can be easily detected at very low concentration (<1 ppm) by the olfactory senses which, however, are rapidly desensitized at high concentrations. While H<sub>2</sub>S odor has been identified in the exhaust of a limited number of catalyst-equipped cars, concentrations in undiluted exhaust would be expected to be at or below the TLV for normal fuel sulfur levels.

Phosphine is a toxic gas with a TLV of 0.3 ppm. Exposure symptoms include diarrhea, nausea, vomiting, tightness of chest, cough, headache, and dizziness when exposed to levels averaging below 10 ppm. Death has been reported after 1 to 2 hours exposure to concentrations of the order of 8 ppm. There are apparently no cumulative effects except the longer range possibility of chronic phosphorus poisoning. There are scattered reports of qualitative identification of PH<sub>3</sub> in catalyst car exhaust but current regulations on phosphorous levels in unleaded gasoline should prevent levels approaching the TLV even in undiluted exhaust.

#### AUTOMOTIVE SULFATE CONTROL OPTIONS

##### INTRODUCTION

Approaches which could be used to limit sulfate emissions from automobiles fall into three basic classes: limitations on the quantity of sulfates emitted from individual vehicles, and limitations on the sulfur content of motor vehicle fuels and limitation of the percent of automobiles employing catalysts. The EPA currently has regulatory authority to carry out the first two types of approach. Section 202(a) of the Clean Air Act permits the establishment of emission standards for new vehicles, while Section 211(c) permits the regulation of motor vehicle fuel composition. The auto industry may choose the third approach in order to avoid sulfate emission regulation.

At present, information on the feasibility, costs, and time requirements of various approaches to reducing automotive sulfate emissions is quite limited. Some such information was submitted to EPA in response to the Federal Register Notice of March 1974 seeking information on automotive sulfates. More recent submissions to EPA on the status of auto manufacturers' emission control development programs indicate that their efforts in the area of sulfate control are quite limited. EPA currently has studies in progress which are relevant to both vehicle emission limitations and fuel sulfur limitations.

##### VEHICLE EMISSIONS LIMITATIONS

Automotive sulfate emissions could be limited through imposition of a light duty vehicle emission standard for sulfates. Implementation of such an emis-

sion standard would require the development of a standardized test procedure which could be used on prototype vehicles on a routine basis during annual emission certification and which might also be used in various field surveillance or enforcement audit tests of production vehicles. This approach would also require the establishment of a level for the emission standard below which automotive sulfate emissions are considered to be acceptable. Most importantly, implementation of such an emission standard would require the availability of satisfactory control technology to permit the simultaneous achievement of the sulfate standard and the existing and future standards for HC, CO, and NO<sub>x</sub>.

As an alternative to the implementation of a formal emission standard, an effort might be made to induce auto manufacturers to voluntarily reduce sulfate emission levels from vehicles. Such a voluntary approach would eliminate the need for formal adoption of a test procedure and emission standard and the continuing expense to EPA and manufacturers of demonstrating compliance with the standard. However, its implementations would still be dependent on the availability of suitable control technology.

Approaches which might be taken by auto manufacturers to reduce sulfate emissions can be categorized into three classes: (a) Adoption of non-catalyst emission control technology for most models, (b) Modification of catalyst system design to reduce sulfate formation, (c) Use of sulfate traps.

Available information on the feasibility, cost, and time required for implementation of each of these approaches is discussed briefly below.

#### ADOPTION OF NON-CATALYST EMISSION CONTROL TECHNOLOGY

Oxidation catalysts have been adopted by auto manufacturers because they represent a highly effective and relatively inexpensive approach to reducing HC and CO emissions from gasoline-powered reciprocating internal combustion engines. Use of catalyst technology to clean up engines exhaust has also permitted manufacturers to reduce their reliance on certain types of engine modifications previously used for HC and CO control and to tune engines for improved fuel economy.

Nevertheless, various non-catalyst approaches also have either demonstrated capability or promise of meeting current interim and planned statutory emission levels for HC and CO without the use of oxidation catalysts, assuming that a NO<sub>x</sub> standard no more stringent than 1.5-2.0 g/mi is required. The technological status of these non-catalyst alternatives is discussed more fully in the annual "State of the Art" report on automotive emission control technology prepared for use in the standards suspension consideration. However, the principal alternatives and some of their more important characteristics are summarized in Table 8.

With the possible exception of the diesel engine, the limited data available on sulfate emissions from non-catalyst vehicles, including those with CVCC stratified charge and rotary engines, indicate that minimal formation of sulfate can be expected. Implementation of non-catalyst technology on most new cars is not likely to be possible before the 1979 model year if either the 1975 California interim standards or 1977 standards for HC and CO apply then. However, non-catalyst technology need not be applied to all cars in order to avoid sulfate concentration problems.



TABLE 8.—NONCATALYST EMISSION CONTROL ALTERNATIVES

Approach	H <sub>2</sub> SO <sub>4</sub> emissions (g/mi)	Earliest widespread availability <sup>1</sup>	Fuel economy impact <sup>2</sup>		First year impact		Other remarks
			HC/CO = 0.9/9.0	HC/CO = 0.41/3.4	HC/CO = 0.9/9.0	HC/CO = 0.41/3.4	
"Can Burn" engine modifications.	Less than 0.001.	1979	None.	10 percent less.	\$160 less.	\$90 less.	Could use leaded gasoline.
Conventional engine with rich thermal reactor.	do.	1979	10 percent loss.	20 percent loss.	None.	\$90 less.	Could use leaded gasoline. Possible particulate emission problem.
WCC stratified charge engine.	do.	Beyond 1980.	None.	10 percent loss.	\$50 less.	\$140 less.	Could use leaded gasoline.
Diesel engine.	do.	do.	20 percent gain.	20 percent gain.	\$125 more.	\$35 more.	Requires distillate fuel; desulfurization may be needed. Odor emissions need more study.
Rotary engine with thermal reactor.	Less than 0.001.	do.	15 percent loss.	20 percent loss.	None.	\$90 less.	Could use leaded gasoline. PNA emissions need more study.

<sup>1</sup> EPA estimates.<sup>2</sup> Relative to conventional engine with oxidation catalyst in 1979 controlled to specified HC/CO level, i.e., diesel at .41/.3.4 HC/CO would cost \$35 more than catalyst-equipped conventional engines at these levels.

The situation for diesel engines is much less clear. One study has reported sulfate emissions of about 0.02 g/mi from a light duty diesel vehicle, comparable with the levels for some catalyst-equipped cars. Other studies have not found such high levels. While the small number of light duty diesel vehicles currently in use in the U.S. would not be expected to have a substantial adverse impact on ambient sulfate levels even if the higher value is correct, further quantification of light duty diesel sulfate emissions (as well as other unregulated emissions from the diesel) is necessary before any effort is made to encourage widespread adoption of the diesel engine as an alternative to using oxidation catalysts.

#### MODIFICATION OF CATALYST SYSTEM DESIGN TO REDUCE SULFATE FORMATION

The efficiency of a given oxidation catalyst in converting sulfur dioxide in engine exhaust to sulfuric acid should depend upon a number of design characteristics of the engine-catalyst system. The physical and chemical characteristics of the catalyst material, the catalyst operating temperature, the amount of oxygen in the exhaust stream entering the catalyst, and the amount of residence time which the exhaust gases spend in contact with the catalyst should all influence the degree of sulfate formation.

These same factors would also be expected to influence the extent to which the catalyst performs its intended function of oxidation of HC and CO. Changes made to reduce sulfate formation would generally be expected to reduce some loss of HC and CO control, making it more difficult for auto manufacturers to achieve required levels of HC and CO with a possible adverse effect on fuel economy. Thus, possible modifications to reduce sulfate formation need to be considered in the context of their interactions with HC and CO control and fuel economy.

Catalyst type (pelletted vs. monolith) has a significant effect on sulfate emission rates during certain types of driving. The differences appear to result from the much greater ability of pelletted catalysts to absorb and later release sulfates than on any difference in the ability of the two catalyst types to form sulfates. While pelletted catalysts exhibited much lower sulfate emission rates than monoliths during low speed driving, such as the Federal emission test procedure (FTP), pelletted catalysts are also characterized by much higher emission rates than monoliths during the transition from intervals of low-speed driving to high-speed driving, when previously stored sulfur compounds may be released. At this time, it does not appear that pelletted catalysts hold any major overall advantage over monolith catalysts in terms of reduced sulfate impact.

The limited experimental data presently available do not indicate that changes in catalyst type (Pellet vs. Monolith), amount of noble metal used, catalyst operating temperature, or exhaust residence time are likely to achieve major reductions in sulfate emission rates while achieving reasonable levels of HC and CO control with the catalyst.

However, there is very limited experimental data which suggests that different catalyst formulations may reduce sulfate emissions at a given level of HC and CO. The control of oxygen content of the exhaust also appears to show significant potential as a sulfate control technique. Very limited experiments have shown that elimination of injection of air into the exhaust stream except during engine warm-up can achieve reductions in sulfate emissions of 50% or more. A substantial loss in CO control accompanied the sulfate reduction, but the final HC and CO levels were at least still well below the 1975 California interim standard levels. More sophisticated types of air injection modulation might allow substantial sulfate reductions with less loss of CO control, but these approaches have not yet been investigated. If modulated air injection is found to be a feasible sulfate control approach, it should be relatively inexpensive (about \$20) approach which would be available for implementation as early as the 1978 model year.

An alternative approach to controlling oxygen concentrations in the catalyst would be the use of an oxygen sensor in the exhaust providing feedback control of a fuel injection system. This technique, used in the 3-way catalyst, is being looked at as a candidate for simultaneous control of HC, CO and NO<sub>x</sub>. This system is receiving particular attention in Europe and was discussed in detail in the recent NAS report on emissions control devices.

An important consideration in any further development of oxygen level control techniques for sulfates should be a thorough characterization of other unregulated pollutants, particularly other sulfur compounds. The relatively limited

problems with hydrogen sulfide odor from catalyst-equipped cars now being reported could be magnified greatly if cars were designed to operate with very low excess oxygen levels at the catalyst.

In addition to the factors discussed above, reductions in vehicle weight and aerodynamic drag implemented to improve fuel economy will also reduce sulfate emission rates. For example, the joint DOT-EPA fuel economy study concludes that an increase in automotive fuel economy from an average of 15.0 mpg in 1975 to 17.3 mpg in 1980 is feasible through shifts to smaller cars. Such a shift would reduce average sulfate emissions per vehicle by about 10%, independent of any changes in catalyst system design.

#### USE OF SULFATE TRAPS

Preliminary testing conducted under an EPA contract has shown that traps which absorb sulfuric acid through chemical reaction with a solid trapping material show promise as a sulfate control technique. A prototype trap was tested over 25,000 miles of use and showed consistent reductions in sulfate emissions of 90% or more during all types of driving. Furthermore, particulate emissions resulting from attrition of the sorbent material were found to be minimal.

The prototype trap exhibited one major flaw: excessive pressure drop which increased with use of the trap. The contractor is currently screening other possible trap materials and investigating ways of reducing the pressure drop while maintaining high trapping efficiency. Unfortunately, the auto manufacturers' annual submissions on their progress in light duty vehicle emission control indicate that no effort to develop sulfate traps is being made by the industry.

If the manufacturers were to initiate a major effort to develop sulfate traps it is unlikely that they could be available for installation prior to the 1979 model year, at the earliest. The cost of a sulfate trap should be somewhat less than that for a pelleted catalyst, probably in the range of \$60 to \$100 per vehicle. If trap replacement is needed periodically (say at 25,000 mile intervals) the lifetime cost would be higher.

#### IMPLEMENTATION OF A SULFATE EMISSION STANDARD

As noted above, implementation of non-catalyst technology at the 1975 California interim on 1977 statutory HC and CO control levels could probably not be widespread prior to the 1979 model year. Implementation of a modulated air-injection approach to controlling sulfate formation is not likely before the 1979 model year at the earliest. All of these estimates reflect development and production lead times only and assume that manufacturers begin a substantial effort to reduce sulfate emissions immediately. In fact, manufacturers are likely not to begin major development efforts until after a sulfate emission standard is promulgated.

Based upon the present limitations of automotive sulfate test procedures and the minimum time required to develop and adopt regulations, a decision now to proceed with a sulfate emission standard would not result in final regulations being promulgated before early 1976. A delay to mid 1976 is quite possible.

Once regulations are promulgated, both EPA and industry laboratories will require some period of time to procure and install the new test equipment needed and to develop competence in the more complex emission tests involved. Independent of the availability of suitable control technology, certification testing under a sulfate standard could not be carried out before the 1979 model year.

In summary, a major effort to reduce sulfate emissions voluntarily, started now by auto manufacturers, might be capable of achieving significant reductions in sulfate emissions beginning with the 1978 model year. It is more likely, however, that significantly reduced sulfate emissions will not be possible through vehicle emission limitations prior to the 1979 or 1980 model year.

#### FUEL SULFUR LIMITATIONS

Available vehicle test data generally indicate that the rate of sulfate emission from catalyst-equipped cars decreases linearly with reductions in gasoline sulfur content. Therefore, a 50% reduction in the average sulfur content of unleaded gasoline, for example, would result in a corresponding 50% reduction in sulfate emission factors. Reducing gasoline sulfur levels has the advantage over vehicle emission limitations of acting on the whole population of catalyst-equipped cars on the road at the time control is instituted, whereas vehicle emission limitations



will impact only on new catalyst-equipped cars sold after the effective date of the limitation. Thus, for example, achieving a 50% reduction in fuel sulfur level would have a larger immediate effect in reducing sulfate exposures than would achieving a 50% reduction in sulfite emissions from new cars through changes in vehicle technology.

Section 211(c)(1)(A) of the Clean Air Act authorizes EPA to regulate the composition of motor vehicle fuels if emission products resulting from use of those fuels endanger the public health or welfare. This is the same authority that has been used to adopt the lead phase-down regulations. The Act specifies that as a precondition to adopting such regulations, the EPA must consider all relevant medical and scientific evidence available, including consideration of other technologically or economically feasible means of achieving the needed emission reductions. Thus, prior to adopting regulations requiring a reduction in the sulfur content of unleaded gasoline, EPA must establish that reduced sulfate emissions are necessary to protect the public health or welfare, and that control of such emissions through vehicle modifications is either not technically feasible or is substantially more costly than reducing fuel sulfur levels.

If faced with a requirement to reduce gasoline sulfur content, petroleum refiners have two basic types of approaches available to them. One is to blend the lower sulfur content components available from the refinery into the unleaded gasoline while using the higher sulfur materials in other gasoline grades. The second is to install additional processing steps to remove sulfur from various refinery streams. These two approaches, which differ substantially in time and extent of applicability, are discussed further below.

#### BLENDING AND ALLOCATION APPROACHES

As produced by a modern petroleum refinery, gasoline is not simply a natural product separated from other components of crude oil. Rather, different grades of gasoline are "assembled" by the refinery by blending together in suitable proportions the products of various chemical processing steps. Some of these materials have a sulfur content of less than 10 parts per million (ppm) while others may be as high as 1500 ppm. In most parts of the U.S., the final blend typically has a sulfur content of about 300 ppm.

By selectively blending the lower sulfur content materials into the unleaded gasoline product, a refiner should theoretically be able to achieve major reductions of the sulfur content of that gasoline. Of course, the sulfur level of leaded grades would increase accordingly, but the minimal conversion of fuel sulfur to sulfates by non-catalyst cars which would use the leaded grades makes this of no concern from an air quality standpoint.

Practically, the refiner is limited in the extent to which he can carry out this process. First, the components that are low in sulfur are high in octane. These high octane components must be used to some extent in the leaded gasolines to provide satisfactory octane quality. In fact, the institution of the lead phase-down regulations would increase the need for these low sulfur components in leaded grades. This is further compounded by the fact that high sulfur components do not achieve as large an octane boost from adding lead as do low sulfur materials. Thus, there is an incentive to the refiner to use the low sulfur components in the leaded, rather than unleaded, grades. Finally, the refiner is limited in the extent to which he could reduce unleaded gasoline sulfur levels through blending by the relative demand for unleaded and leaded gasolines. As more and more cars on the road demand unleaded gasoline and fewer leaded, the refiner must begin to use more of the higher sulfur materials in the unleaded grade in order to produce the needed amount of that product.

Based on comments received from refiners, it appears that a maximum of about 20% to 30% of all gasoline produced could be unleaded of low (100 ppm) sulfur content, but this would not necessarily be geographically distributed according to the need for such fuel. Depending on the extent to which sales of new cars pick up from their current low rate, and assuming that virtually all new cars sold beginning with the 1975 models require unleaded gasoline, selective blending could provide an adequate supply of low sulfur unleaded gasoline approximately through calendar year 1977. The cost to refiners of implementing such a blending scheme has not yet been quantified, although it would be quite small in comparison with installing new fuel desulfurization capacity.

An extension of the blending approach would be allocation of low sulfur unleaded gasoline preferentially to those geographic areas where automotive

sulfate impacts would be largest. Some reallocation of low sulfur products would probably be needed to provide areas such as Southern California with adequate supplies of low sulfur gasoline even through 1977; more extensive allocation efforts could keep up with new car demand for unleaded gasoline in key areas somewhat longer. An EPA review of the extent to which allocation would be feasible is in progress and should be completed by May 1975. Contacts have also been made with FEA whose allocation authority would probably be required to implement such a program.

The implementation of a blending and allocation scheme would involve several steps. First, the details of the allocation plan would have to be developed. This would rely on the EPA review now in progress and would probably not be completed before late summer of 1975 at the earliest. Then, some effort to convince refiners to implement the scheme would be needed. If this were to take the form of regulations under Section 211 of the Clean Air Act and under suitable FEA authorities, promulgation of such requirements before mid-1976 is unlikely. Alternatively, a voluntary compliance approach might be considered, but at a minimum this would seem to require pricing action by FEA to allow refiners to recover the added costs of blending and shipping to target areas the low sulfur gasoline. Finally, refiners would require some time to implement the new procedures. Actual blending of low sulfur gasoline should be possible quite quickly (probably less than 6 months), but procurement of additional storage and transport facilities might be needed to distribute the fuel to the target areas. Overall, it appears unlikely that significant quantities of low sulfur unleaded gasoline would be available in key target areas before 1977, and possibly not until 1978.

#### DESULFURIZATION

While blending and allocation approaches could potentially provide low sulfur unleaded gasoline for a few years, if low sulfur gasoline is needed on a continuing basis the only alternative is desulfurization. EPA has conducted one contract study of the feasibility and costs of implementing gasoline desulfurization and a second study to refine those estimates is in progress. Another study has been conducted for General Motors and several petroleum companies have made their own analyses of this approach.

In general, it is agreed that the technology needed to reduce the sulfur level of unleaded gasoline (at least to 100 ppn) is presently available, and that it will take a capital investment of about \$2-4 billion and a lead-time of about 4 to 6 years to put the petroleum industry in a position to meet the demand of a full population of cars requiring unleaded low sulfur gasoline. A cost increase of about 1-2 cents per gallon would be required to provide low sulfur gasoline and an energy penalty of about 1% is typical of the estimates.

The 4-6 year lead-time estimate given above is from the time that refiners make a commitment to install desulfurization capacity. In view of the large investments required, it must be assumed that such commitments will not be made at least until after final promulgation of appropriate EPA regulations, and possibly not until any legal challenges to the regulations have been resolved. Thus, desulfurization is a long-range alternative which would not be expected to have much impact until after 1980.

#### SUMMARY OF CONTROL OPTIONS

No regulatory approach could be expected to have much effect on the projected growth in the impact of automotive sulfate emissions before the end of the 1976 model year. An interim measure in the form of regulations requiring reductions in the average sulfur level of unleaded gasoline based on fuel blending and allocation of these low sulfur fuel supplies to the most critically impacted areas might be put into effect during 1977 if vigorous efforts to develop the needed regulations are initiated soon. If very limited preliminary indications regarding the feasibility of reducing sulfate emissions through control of vehicle air injection are proven out, and if manufacturers initiate efforts to develop and adopt such techniques quickly, significant (at least as an interim measure) reductions in sulfate emissions could be achieved beginning with 1978 models. However, if emission standards are required to force such development and implementation, no impact before the 1979 models is likely. By 1979, auto manufacturers might also be able to utilize sulfate traps or non-catalyst emission control technology to meet sulfate emission standards. If vehicle control technology for sulfates is



found infeasible, and if continued reliance on oxidation catalysts is necessary to achieve other goals, gasoline desulfurization will be required. However, desulfurization cannot be expected to have much impact until after 1980. Once implemented though, desulfurization could relatively quickly reduce automotive sulfate emissions from the entire car population.

While there are a number of important caveats repeated in this benefit-risk analysis paper, the conclusions are:

1. The introduction and continued sales of light duty motor vehicles equipped with oxidation catalysts will probably result in a net public health risk if no control measures are instituted.

2. A large portion of the benefits projected will occur in Southern California.

3. A large portion of the risks will be concentrated in, but not limited to, the eastern United States.

4. Benefits will be greater for the first few model years as uncontrolled vehicles are replaced by stringently controlled vehicles.

5. On balance, public health risks will exceed benefits in all areas of the country after 4 model years are equipped with catalysts.

#### AGGRAVATION OF HEART AND LUNG DISEASE

Elevated ambient levels of oxidants and particulate sulfate-sulfuric acid are thought to aggravate the symptoms experienced by elderly persons with chronic heart and lung disorders. The benefit-risk approximation indicates a net increase in the aggravation of heart and lung disorders when all vehicles are equipped with catalysts. However, one would expect most of the benefits in the far west and most of the increased risk in the eastern United States. Net benefits are expected for 4 to 6 model years in Southern California while only net risks are projected elsewhere at any time.

#### ACUTE LOWER RESPIRATORY DISEASE IN CHILDREN

While particulate sulfate-sulfuric acid exposures are thought to increase the frequency of acute lower respiratory disease in children, the existing epidemiological studies have not yet been able to disentangle such oxidant effects. EPA scientists, however, feel that measurable benefits would follow the reduction of peak oxidant exposures in Southern California. The analysis projects little or no catalyst-associated risk among children in Southern California, but substantial risks for children in the eastern United States.

#### CHRONIC RESPIRATORY DISEASE SYMPTOMS

At the present time there is not a substantial body of laboratory or epidemiologic evidence suggesting that either oxidants or carbon monoxide constitutes a risk factor for chronic respiratory disease. Such is not the case for particulate sulfate-sulfuric acid. The analysis suggests that the use of catalysts will result in a substantial increased risk for chronic respiratory disease. Again, almost all of the project risk occurs in the eastern United States and will begin to occur only after the expected exposures projected for 2 to 4 model years of catalyst-equipped vehicles are maintained for several additional years.

#### PREVALENCE OF IRRITATION SYMPTOMS AMONG OTHERWISE HEALTHY ADULTS

Eye irritation, transient cough, ill-defined chest discomfort and headache are considered. Increases in the frequency of such symptoms after exposures to elevated levels of oxidants are well documented. While no dose-response function is available for exposures to particulate sulfate-sulfuric acid although increases in irritation symptoms are hypothesized. The use of oxidation catalysts thus provides a net benefit in so far as irritation symptoms are concerned, particularly in Southern California.

#### CONCLUSIONS

- (1) Exhaust sulfuric acid collection and analytical techniques have been refined and specific procedures documented. The Federal Emissions Test Procedure for regulated pollutants cannot be used solely to ascertain sulfuric acid emission factors. Sulfuric acid emission factors have been estimated. Vehicles being built to meet the National Interim Emissions Standards have lower sulfuric acid emissions than do those designed to meet either the California Interim Standards

or the Statutory HC/CO Emission Standards, for which comparable sulfuric acid emission rates are expected.

(2) Physical model exposure estimates suggest that on and near major arterial thoroughfares in major urban cities the incremental sulfuric acid exposures will exceed the health effects threshold a few days of the year after 2 model years of vehicles are equipped with catalysts in Southern California and after 3 to 4 model years are so equipped nationally.

(3) Best judgment adverse health effects threshold for particulate sulfates are  $\sim 10 \mu\text{g}/\text{M}^3$  for 24 hours exposures. These threshold values are for susceptible persons with existing heart and/or respiratory disorders. Threshold effects levels for sulfuric acid aerosols are probably somewhat lower than these values. Short term, (1-2 hours) thresholds are not available, but easily measured effects are observed in young, healthy people after 15 minute exposures to concentrations of sulfuric acid of 350-500  $\mu\text{g}/\text{M}^3$ .

(4) Three basic control approaches are available to limit sulfuric acid emissions: increased use of non catalyst technology, modifications to catalyst systems to reduce sulfate formation on trap sulfates before they are emitted, and reductions in gasoline sulfur levels. Gasoline desulfurization cannot be expected to have much impact before 1980 although as an interim measure gasoline sulfur reductions through blending and allocation procedures probably on a selective geographic basis—may be possible. Control of vehicle sulfate emissions through an emission standard would likely have no impact before the 1979 model year. At 49 State or California Interim Standard levels, or at Statutory Standard levels manufacturers are unlikely to eliminate catalyst usage on a major proportion of their production before the 1979 model year.

(5) A public health benefit/risk analysis which weighs the benefits associated with decreased carbon monoxide and oxidant exposures against the risks due to increased sulfuric acid exposures, suggests that on a national basis health risks exceed the benefits after 4 model years are equipped with catalysts. It should be noted, however, that this conclusion is based upon assumptions about dose responses, and human exposure about which there still remain uncertainties.

(6) A number of unique non-regulated emissions in addition to sulfuric acid have been identified and/or suggested from oxidation catalyst-equipped vehicles. None appear to pose a short term health risk at this time; however, we lack detailed emissions information in many cases. We are not able, at this time, to estimate the potential long term chronic health risks. Research is accelerating on these issues.

Mr. ROGERS. So you have recommended that we extend the current standard for an additional year.

Mr. TRAIN. That is correct.

Mr. ROGERS. Now what do you recommend with respect to the President's recommendation for a 5-year extension?

Mr. TRAIN. Well, my proposal was as follows, and again, I want to emphasize these are proposals.

Mr. ROGERS. I understand that.

Mr. TRAIN. My proposal would be to hold the Federal interim standard for hydrocarbon and carbon monoxide at 1.5, 15 grams per mile, in 1977, 1978, and 1979 to impose a sulfuric acid emissions standard applicable to the 1979 model year, and to go to the California interim standard for hydrocarbon and carbon monoxide 0.9 and 9 grams per mile respectively for 1980 and 1981, and to apply the 2 NO<sub>x</sub> level for the full 5-year period. And you will find a great deal of argument over that.

The industry feels, I believe, that this will substantially impede their efforts to achieve better fuel economy.

Mr. ROGERS. Now let me ask this. If the sulfate problem had not arisen, what would have been your recommendation?

Mr. TRAIN. If the sulfate problem had not arisen, I think it is quite clear I would have had no alternative but to deny the suspension application and, as a result of that action, the full statutory standards would have come into effect, absent action by the Congress, obviously, for 1977.

Mr. ROGERS. And what would you have recommended for 1978, 1979, and 1980?

Mr. TRAIN. Well, absent action by the Congress, they would have stayed there.

Mr. ROGERS. Yes. So you felt it would have been possible to meet those had there not been, in your judgment, the sulfate problem.

Mr. TRAIN. I should be quite clear on this. I believe the technology is very much available for meeting the statutory hydrocarbon and carbon monoxide standards. The statutory nitrogen oxide standard of 0.4 gram per mile is probably something else again. There are technologies for reaching this, but I think we have proposed in the past, and I would propose again, that a 2 level, and certainly nothing more stringent than a 1.5 level, be set during this period of time, in part because even if it could be reached, it is our feeling that such a very stringent nitrogen oxide standard would have a very impeding effect on the development of other technologies, such as stratified charge, diesel and so forth.

Mr. FLORIO. Mr. Chairman, would you yield for one question? On the basis of these rather important policy decisions you are making, which you are quite candid in saying were made on the basis of hearsay and less than authoritative information, what, if anything, is your Agency doing to commission an authoritative report or study on the relative dangers of sulfates as contrasted with the benefits of the emission control program as it is currently in existence?

Mr. TRAIN. I think you misunderstood me, sir. I didn't say I was acting on the basis of hearsay. I used the expression "hearsay" to de-



scribe my knowledge about the pre-1974 history of the catalyst matter. I only came into the Agency in late 1973. That is where I used the word "hearsay." I didn't want to sound as if I was speaking from personal knowledge about what General Motors did or what Ford did. I just simply have been told these things.

Insofar as the data upon which I made my decision, like a great deal of data in the environmental area, scientific data generally, is not perfect. It is the best data we have available. It has been the result of extensive scientific work on the part of the Agency over the past year or more to understand better the sulfate problem. We have had extensive laboratory tests with respect to catalytic emissions on animals and others. We have had contract tests by Harvard University, among others, on these emissions. We have had monitoring stations set up along highways to try to measure actual ambient levels of sulfate emissions from 1975 cars. We have had extensive model simulation efforts to project the levels of concentration—

Mr. ROGERS. Well, it might be well to put all of this in the record so we will have exactly what has been done, if that would be satisfactory.

Mr. TRAIN. And I might add that all of this information has been made public, and no one has really disagreed with it.

Mr. ROGERS. All right. My time is just about up because we are going to try to keep to 5 minutes here.

Isn't it true that the Federal Energy Administration, and the Commerce staff people who worked with your staff believe that further study was necessary before significant action could be taken? In fact didn't they recommend about 2 more model years? And doesn't the Department of Transportation believed benefits from continued reductions in carbon monoxide through the use of the catalyst would continue to outweigh risks associated with emissions of sulfuric acid?

In other words, FEA, Commerce and DOT felt that making the judgment now was either not properly supported by scientific efforts and that the dangers of the other outweighed taking action at this time; whereas, as I understand it, ERDA and HEW agreed with you.

Mr. TRAIN. The information you have given me, Mr. Chairman, is the first I have ever heard of any such conclusion by the Department of Commerce, DOT or FEA.

Mr. ROGERS. Well, I understand this information was given to the President by OMB. You were not aware of that?

Mr. TRAIN. I certainly have never seen or—

Mr. ROGERS. Was your staff unaware that this was a position taken by those agencies in their meetings?

Mr. TRAIN. We never had any meetings with the Department of Commerce or DOT or FEA in arriving at our decision.

Mr. ROGERS. You mean the EPA staff did not monitor the inter-agency review—

Mr. TRAIN. I have not completed my statement, Mr. Chairman.

We did not participate in any such efforts. The OMB did call meetings of representatives of other agencies to get their views, as I understand it, of the catalyst problem and the sulfate issue.

Mr. ROGERS. Well, I don't say that is improper. I am just saying—

Mr. TRAIN. I am not saying you did, Mr. Chairman. We stated that we did not feel that we should participate as part of the process of



eliciting views or making comments, but we did state that we would have a member of our staff sit in and listen to what was going on.

Mr. ROGERS. Well, as I understand it, your staff monitored the inter-agency review but reserved their advice for the administration's decision process. But they were well aware that three of the agencies or departments did not share the conclusion which EPA, HEW, and ERDA had agreed upon.

Mr. STRELOW. Mr. Chairman, you are correct—

Mr. TRAIN. I think at this point I had better identify who is with me at the table.

On my right, Dr. Wilson Talley, Assistant Administrator for Research and Development. On my left, Mr. Roger Strelow, Assistant Administrator for Air and Waste Management. On my far left, Mr. Eric Stork, Deputy Assistant Administrator for Mobile Source Air Pollution Control.

Mr. ROGERS. We welcome these gentlemen.

Mr. STRELOW. Mr. Chairman, the record should be clear on this. The agencies were originally asked by OMB to forward their views on the latter. We made available to them, for example, copies of the transcript of the hearing, but did not discuss it with them in any way. A number of agencies did send in comments to the Agency. Mr. Train has mentioned that we did get the comment from the HEW expressing quite serious concern.

It was our feeling that when we got down to the final judgment, as Mr. Train has mentioned, this was a judgment reached on the basis of health information and health data—really the only basis—and, therefore, the views of some of the other agencies simply did not weigh in nearly as heavily. For example, HEW's feelings—

Mr. TRAIN. Let me say, Mr. Chairman, I have discussed, subsequent to the decision, this decision of mine with the head of FEA, with the Undersecretary of the Department of Transportation, Mr. Barnum, who was then Acting Secretary, and I have never heard these expressions that we should continue the use of a catalyst for 2 more years from the heads of the agencies at all.

Now I know that within the administration there are concerns over the energy impact of my proposals because if it in fact means taking off a catalyst, this makes it exceedingly—I won't say exceedingly—but it makes it more difficult to achieve fuel economy goals. But let me assure you that in reaching a decision on a health issue, I am not aware of the health expertise of either DOT, FEA, or the Department of Commerce.

Mr. ROGERS. Well, I won't pursue this now because my time is up, but I might say that Dr. John Goldsmith, who was with the California Department of Special Medicine and Epidemiology, now with the Natural Science Foundation, characterized the issue paper of EPA as inference based on untested assumptions and best judgment guesses.

Now, I am not asking you to comment at this time. I will go into it later.

Mr. CARTER. Judge Train, I certainly think you have made a good witness today. Of course, you know last year that you were reminded that sulfates might well become a pollutant, is that correct?

Mr. TRAIN. Yes.

STATEMENT OF HON. FRANK G. ZARB, ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION; ACCOMPANIED BY KENNETH WOODCOCK, ASSOCIATE ASSISTANT ADMINISTRATOR FOR ENVIRONMENTAL PROGRAMS, AND JUDITH LIERSCH, DIRECTOR, FUEL UTILIZATION

Mr. ZARB. I have to leave at 3:15. I will return another day, if the committee wishes.

Mr. ROGERS. It may be necessary.

Mr. ZARB. I have with me Mr. Ken Woodcock on my left and Judy Liersch on my right.

Mr. ROGERS. We welcome you all.

Mr. ZARB. In the interest of time, I will submit my statement for the record.

Mr. ROGERS. Without objection, it will be made a part of the record.

[Testimony resumes on p. 149.]

[Mr. Zarb's prepared statement follows:]

STATEMENT OF HON. FRANK G. ZARB, ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION

Good afternoon, Mr. Chairman and members of the Subcommittee. I appreciate this opportunity to discuss the Administration's proposed amendments to the Clean Air Act. My comments will focus on those recommended changes to the Act which have significant energy implications. I will reference to the extent possible the analyses that FEA has conducted and discuss the bases for these amendments, in order to assist this Subcommittee in its deliberations on the proposed amendments.

I believe the Administration's proposed Clean Air Act amendments should be enacted for three important reasons:

First, certain existing provisions could result in adverse economic and energy impacts, which could outweigh the achievable environmental benefits.

Secondly, there is the need to implement a national plan to increase the use of domestic coal resources, and

Thirdly, we have the need to reduce the consumption of petroleum products in automobiles and powerplants.

The Clean Air Act amendments of 1970 were a major legislative landmark for the Nation. Great strides in reducing pollution from all major sources have resulted. However, since the passage of the amendments, our Nation has undergone significant changes which could not have been foreseen in 1970.

As a consequence of the change in the Nation's economic and energy situation, certain requirements and deadlines established in the 1970 amendments need to be deferred. This is not to say that the clean air goals must be sacrificed. We believe that the central goal of the Clean Air Act—the protection of public health and welfare—must be maintained. This goal has not been abandoned in the proposed amendments.

On the contrary, the effect of certain of the amendments will actually facilitate the attainment of environmental objectives, while reducing economic and energy penalties. The amendments are designed to allow for selective delays in those areas where additional time is necessary for the installation of needed control technology, development of domestic clean fuel resources, or attainment of improved decision-making information.

My testimony does not cover all of the analysis that has been completed within the Administration in examining the major Clean Air Act issues. However, additional supporting information will be provided to you in the legislative environmental impact statement which is now being prepared for the entire Energy Independence Act of 1975. This environmental impact statement is expected to be published later this month.



## INTERMITTENT CONTROLS

I would first like to turn to the subject of intermittent control systems for powerplants.

FEA has previously studied the problem of the unavailability of required clean coal or needed control equipment to meet the State implementation plan emission limitations by the 1975-77 deadline. These assessments, and subsequent studies conducted by EPA, have indicated that because of the clean fuels deficit—that is, insufficient supplies of scrubbers or low-sulfur coal—certain State implementation plan requirements cannot be met by statutory deadlines. In order to meet primary standards in all areas, it will be necessary to extend compliance deadlines beyond the 1975-77 period, and allow the interim use of intermittent control systems in those areas where primary ambient air quality standards can be enforceably and reliably maintained through the use of such controls. This would permit the limited supplies of low-sulfur coal and control equipment, that are available, to be used in those areas with the greatest pollution problem, thereby assuring a more rapid nationwide attainment of primary standards.

The Administration's proposed amendment relating to intermittent control systems would implement such a strategy by providing additional time for eligible plants to install continuous emission control equipment, and by allowing additional time to contract for supplies of low-sulfur coal as they become available.

The amendment would also relieve uncertainties which now inhibit the development of the Nation's coal resources. Higher sulfur coal would have a definite mid-term market, and could continue to be used by plants as they install scrubbers. The long-lead time would also permit the development of low-sulfur coal supplies. In addition, capital expenditures and energy penalties associated with scrubbers would be delayed. Furthermore, the deferral in capital expenditures would help to alleviate the current financial difficulties of the electric utility industry. The economics of sulfur dioxide control have been analyzed in a recent EPA study (November 1974) that was submitted to the Energy Resources Council.

The Administration's proposed amendment will ensure the permanent control of sulfur oxides emissions from powerplants, while allowing additional time for scrubber installation or acquisition of long-term low-sulfur coal contracts. The proposed amendment would authorize compliance schedule extensions to allow rural powerplants up to January 1, 1985, to install and operate scrubber systems or acquire long-term low-sulfur coal contracts. Until permanent emission control systems are operational, these plants could employ intermittent control systems, where reliable and enforceable, to meet primary ambient standards. Under no circumstances would extensions be granted in areas where the primary (health-related) sulfur oxides standard would be violated.

All other existing plants, especially urban plants, would be required to install permanent controls as expeditiously as practicable. New sources would continue to be required to meet new source performance standards. EPA, at the same time, is continuing to encourage the revision of State implementation plan emission limitations that are more stringent than necessary to achieve primary ambient air quality standards.

Objections to use of intermittent control systems have been raised. The major objection to their use has been the concern that they do not minimize sulfur oxide emissions; but rather use the dispersive capabilities of the atmosphere to achieve ambient air quality standards. EPA has been particularly concerned about the widespread use of intermittent controls because of a potential sulfates health problem.

FEA's Office of Environmental Programs has closely followed the activities in the scientific community regarding the sulfate question. In addition, FEA supported a separate, independent appraisal of current research knowledge regarding health criteria for sulfur oxides. Today we would like to provide to this Subcommittee a draft copy of the report titled: "A Critical Evaluation of Current Research Regarding Health Criteria for Sulfur Oxides" by Tabershaw/Cooper Associates [see p. 146].

Tabershaw/Cooper is a medical consulting firm which has been involved in the development of several criteria documents used in setting occupational health standards, including sulfur dioxide and sulfuric acid, for the National Institute of Occupational Safety and Health.

FEA has recently received the Tabershaw/Cooper report, is now assessing the results, and we are discussing the report with EPA, and other appropriate agencies.

We believe certain of the conclusions in the report, presented below, are noteworthy:

The extent to which general air pollution must be controlled—in quantitative terms, in order to eliminate totally the adverse health effects in the community—has not been resolved.

It is not possible, from the evidence now available, to determine the quantitative contribution or relative importance to the deleterious health effects, of separate classes of air pollutants.

Attempts to further distinguish and differentiate between the casual contribution to health harm of particulate sulfates and sulfur dioxides, by epidemiological and statistical means, have not been found to be valid.

The Tabershaw/Cooper report raised questions as to whether data now available are adequate for formulating sulfate control strategies. Other organizations and individuals who testified before the EPA automobile emission suspension hearings, have similarly expressed concern over the present gaps in the scientific basis for determining the potential sulfate health effects from powerplant emissions.

The Administration's proposed amendment on intermittent control systems also provides the opportunity to defer the use of continuous controls for sulfur dioxide for non-urban coal burning powerplants until more refined control strategies can be developed. In the interim, acquired knowledge on sulfates should provide a sound basis for developing viable geographical-specific control strategies that will allow for the protection of public health in a cost-effective manner.

The use of intermittent controls is consistent with our national energy program in that it encourages the utilization of coal. An EPA analysis has indicated that between 18 and 70 plants could use intermittent controls to meet ambient air quality standards for sulfur dioxide. These plants would burn 36 to 106 million tons of high sulfur coal per year, which could, in effect, free up an equivalent amount of low-sulfur coal for facilities that cannot utilize intermittent controls, or avoid the use of an equivalent amount of petroleum.

#### ESECA AMENDMENTS

I would now like to turn to the proposed amendments to the Clean Air Act that relate to the coal utilization program established by the Energy Supply and Environmental Coordination Act of 1974 (ESECA). First, however, I would like to discuss the closely related amendments—which the Administration has proposed in Title IV of the Energy Independent Act—relating to FEA's authorities under ESECA.

Title IV contains three amendments which would extend or expand FEA's authorities under ESECA. As you know, FEA may issue orders converting certain powerplants and major fuel burning installations to coal, and requiring plants already using coal to continue doing so. Specified air pollution requirements must be met, however, before the FEA order goes into effect. FEA may also order powerplants in the early planning process to be constructed with coal-burning capability.

The first proposed amendment to ESECA would extend FEA's authority to issue orders by two years from June 30, 1975 to June 30, 1977.

Using a list of 725 plants which responded to the FCP's Emergency Fuel Convertability Questionnaire, FEA has identified the powerplants in the U.S. that might be able to convert to coal. By applying a lengthy screening and verification process—based largely on the plant's age and boiler size—FEA has substantially reduced the number of potential candidates for conversion to coal. However, in many cases, existing data are not adequate to permit FEA to make, with an acceptable degree of certainty, the findings required by ESECA prior to issuance of orders. A more comprehensive investigation is being conducted to provide the basis for these findings.

FEA will be able, to complete its investigation of many, but not all, of the potential conversion candidates by June 1975. This proposed amendment will allow FEA to issue orders to all powerplants which investigation shows to be appropriate conversion candidates. This could result in a potential additional savings of 200,000 bbls/day of oil.



In addition, the extension of FEA's order-issuance authority will permit FEA to issue orders to a sizeable group of major fuel-burning installations other than powerplants. Although these installations represent an extremely large potential oil savings, the federal government has no firm data base to provide the necessary information on the convertability of these units to coal. FEA is developing the first accurate energy use inventory of the approximately 65,000 industrial boilers of significant size. In addition, FEA is developing a questionnaire to be completed by all larger MFBI's. Responses to the questionnaire will be used to select a group of candidate plants to undergo detailed economic and environmental analyses. The survey effort could not produce adequate data to support issuance of any substantial number of orders by June 30, 1975. However, such orders in the future, could produce a potential savings of 200,000-500,000 bbls/day of oil in the industrial sector by 1980.

The extension of FEA's order-issuance authority will also provide an additional two-year period in which to order powerplants in the early planning process to be built with coal burning equipment. FEA will be able to order plants that enter the "early planning process" as late as June 1977 to be built with coal-burning capability.

The second amendment to ESECA extends FEA's authority to enforce its orders through December 31, 1984. This is a six year extension of FEA's present authority under ESECA.

This extension will insure that the plants which FEA converts from natural gas and petroleum products to coal will continue to use coal for the critical period until 1985. Thus, the oil savings achieved by FEA through great effort will not be lost by voluntary reconversions during the period between 1979 and 1985. Also, plants which must install pollution control equipment before they can convert to coal—in order to meet air pollution requirements—will have an additional six years to do so.

The third proposed amendment to ESECA expands FEA's authority to issue prohibition orders to include powerplants or major fuel burning installations which are designed with or actually acquire the capability of burning coal after the date of passage of ESECA, June 22, 1974. This provision would apply to any existing powerplant or major fuel burning installation which acquires coal burning capability after June 22, 1974; to new powerplants and major fuel burning installations which are built voluntarily with coal burning capability; and to powerplants that receive orders from FEA requiring them to be built with coal-burning capability. All new plants affected by this amendment would be subject to applicable New Source Performance Standards.

Requiring powerplants in the early planning process that receive FEA orders, or are eligible for them, actually to burn coal will result in substantial oil savings—which will be realized until 1985 if the proposed amendment extending FEA's order-enforcement authority is enacted. Requiring plants that were past the early planning process but were not operational in June 1974 to burn coal, if they have the necessary facilities, will also result in additional oil and gas savings. These additional savings for new powerplants and industrial plants of 400,000 bbls/day of oil cannot be realized under the existing ESECA legislation.

In addition to the proposed amendments contained in Title IV of the Energy Independence Act, the Administration is proposing several Clean Air Act amendments that will facilitate conversion of powerplants and major fuel burning installations to coal, while continuing to protect the public health.

First, the Administration is proposing to eliminate the regional limitation provision which now requires a plant to meet SIP emission limitations at the time of conversion pursuant to an FEA order, if there is a violation of primary ambient air quality standards anywhere in the air quality control region in which the plant is located. This requirement applies whether or not the individual plant itself is causing or contributing to the violation of primary standards. Removal of the regional limitation will mean that many plants could convert to coal at an earlier date. We estimate that the regional limitation provision postpones conversions to coal which would result in approximately 236,000 barrels per day oil and oil equivalent natural gas savings in 1977.

Requiring permanent controls before allowing conversion to coal (where not necessary to meet primary standards) would greatly increase the immediate cost of a coal conversion program. Accordingly, it may be impossible for FEA in some cases to make the finding that a conversion requiring the immediate addition of permanent controls is environmentally "practicable." If FEA cannot make a

finding of practicability as required by ESECA, a conversion order cannot be issued.

Hence, the effect of regional limitations in ESECA may be to reduce the number of conversions significantly—or at least to delay them—and thereby to forego or delay the corresponding increase in consumption of coal and the reduction of the imported oil.

Removal of the regional limitation will not jeopardize public health, since the plants will still be required to meet primary ambient air quality standards before burning coal.

A second proposed amendment makes it clear that plants which have historically burned coal and which had, prior to receiving an order from FEA, planned to convert to oil to meet Clean Air Act requirements, are eligible for compliance date extensions under section 119 if they are ordered by FEA to continue using coal. FEA has established that there are several powerplants which plan to switch from coal to oil to meet Clean Air Act requirements; there are undoubtedly also major fuel burning installations in this class. The proposed amendment would enable such plants to have sufficient time to install pollution control equipment for coal burning instead of being forced to switch to oil first to meet pollution requirements, and then later ordered to make another switch back to coal when pollution control equipment is installed. This amendment furthers the goal of coal conversion and eliminates needless, expensive fuel switching in the interim.

A third proposed amendment would permit a plant that received a compliance date extension under ESECA to come into compliance, at the expiration of this extension, with the state implementation plan (SIP) that is in effect at that time. Under existing ESECA authorities, EPA is conducting a review of SIPs to identify those which are more stringent than necessary to attain and maintain national ambient air quality standards, and it will recommend that such SIPs be revised. This amendment would allow plants that receive FEA orders to comply with any revisions in the SIP, thereby assuring that such plants receive equitable treatment in comparison with other plants that do not receive FEA orders and compliance date extensions.

Without this amendment, the conversion program will result in plants that receive compliance date extensions being tied to 1975 SIP's in most instances. This may result in additional expenditures for permanent emission control devices which are no longer needed. In extreme cases, where FEA could not find the conversion to be economically feasible if the source were compelled to meet the 1975 SIPs, this amendment would permit conversions that would otherwise be entirely precluded.

A fourth proposed amendment extends the date of termination of compliance date extensions one year, to January 1, 1980, as a conforming amendment to the proposal to extend FEA's order-issuance authority to 1977. This will permit plants receiving orders and compliance date extensions during the period June 1975 to June 1977 to have an additional period to come into compliance with SIP's. This amendment would, at a maximum, have the effect of extending compliance dates for ESECA coal conversion candidates one year.

This amendment would allow a more reasonable time frame for plants to install pollution control equipment. Of the total 24,675 megawatts of existing utility capacity which FEA is examining for conversion potential, preliminary analysis shows that 8,000 MW need new precipitators and 10,092 MW need to install flue gas desulfurization systems. Precipitator installation lead time is 28-32 months and that for flue gas desulfurization is 3-5 years.

#### SIGNIFICANT DETERIORATION

I would now like to discuss the Administration's proposed significant deterioration amendment. *Sierra Club v. Ruckelshaus*, held that the Clean Air Act requires the prevention of significant deterioration of the Nation's air quality where the air quality is better than that dictated by the Federal health and welfare standards. In light of the decision, EPA recently promulgated final regulations to implement its best judgment of how to prevent significant deterioration of existing clean air areas. These regulations are now the subject of several court challenges by industry and environmentalists, and a period of legal uncertainty is anticipated.

The litigation on the significant deterioration issue was initiated in 1972--at a time when the country lacked a unified national policy on energy. The Nation's consumption of petroleum was skyrocketing then, as were imports



from foreign sources. A related objective of the litigation was to promote energy conservation, and limit the development of new fossil fuel powerplants in this country.

The country's energy situation has changed since that time, and the President's Energy Independence Act of 1975 has been proposed to redirect our Nation's energy future. The energy program calls for mandatory and voluntary energy conservation—policies that have for years been called for by the environmentalist and the conservationist. However, the energy program additionally calls for a substantial increase in the development of our domestic fossil fuel resources for the sake of reducing our vulnerability to foreign energy sources.

The actions proposed to make our Nation less vulnerable would include the construction, by 1985, of: 150 major coal fired power plants, 30 major new oil refineries, and 20 major synthetic fuel plants.

As the supporting analyses for the President's program clearly show, the expansion of our domestic coal resources, and the development oil and gas resources, are necessary to reach the goals of energy independence. Energy conservation alone will not achieve the goal of energy independence. The program also includes proposed legislation that would assist in planning, siting, and constructing the necessary energy facilities to meet the 1985 goal. Legislation that addresses the financial problems of the utility industry has also been proposed. FEA believes the proposal to delete the significant deterioration requirement is consistent with the needs of this program.

The additional uncertainties created by yet another layer of regulatory requirements on the energy industry is not compatible with the goal of expeditiously developing needed domestic energy resources. There is a need to simplify and rationalize the complex regulatory constraints on the domestic energy industry.

Under the significant deterioration program, States could stop or greatly limit resource development activities in certain geographical areas. We believe that siting decisions should be based on a balancing of all environmental factors—not just air pollution—as well as socioeconomic, energy efficiency, and other considerations.

Reports by the National Academy of Sciences and others, have shown that current scientific evidence does not support the need for ambient standards more stringent than the currently promulgated primary and secondary ambient air quality standards for particulates and sulfur dioxide. Accordingly, FEA does not believe the potential benefits from the significant deterioration program justify the potential cost of constraining the development of domestic energy resources.

FEA is particularly concerned about the impact of this uncertainty in delaying development of needed energy resources, especially the construction of large, coal-fired powerplants in the short-term, and synthetic fuel facilities in the longer term. In addition, the significant deterioration regulations could have a major inhibiting effect on the location of new energy projects; and groupings of several energy facilities in one area could be restricted under the regulations.

Accordingly, the President has requested that Congress clarify its position regarding significant deterioration. Specifically, Title VI requests Congress to provide that the Clean Air Act does not require or authorize EPA to establish standards more restrictive than primary and secondary ambient air quality standards.

No measurable impact on public health from the proposed amendment is anticipated, since air quality would not be permitted to deteriorate beyond the national ambient air quality standards, which are based on public health and welfare considerations. The States of course would remain free to impose and enforce standards more stringent than national standards. Furthermore, all new sources are required to meet new source performance standards, which incorporate the best available control technology. Therefore, all new sources are already minimizing pollution to the greatest extent possible.

#### AUTOMOBILE EMISSION STANDARDS

In 1970, the year the historic amendments to the Clean Air Act were enacted, our Nation's energy position was beginning to deteriorate. Total petroleum use was about 14 million barrels per day, and imports represented only 20%. In 1973, energy consumption had grown to 18 million barrels of oil per day, with more than 6 million barrels, or over 35%, made up of imports. If this trend con-

tinues unaltered, our projections indicate that, even accounting for the reduced consumption caused by last year's price increases, the United States could depend on foreign oil for better than half of its daily oil consumption by 1985. This growing dependence on imported oil threatens not only our economic solvency but—considering the possibility of another oil embargo—represents a serious threat to our national security. The President is determined to act on this critical problem and has charged FEA with part of the responsibility for identifying and implementing measures to reduce our energy vulnerability. We have focused on automobile fuel economy as an area in which significant fuel savings can be produced.

The transportation sector currently accounts for one-fourth of all the energy consumed in the United States. Since it relies almost exclusively on oil for fuel, transportation is responsible for over half of the Nation's total petroleum consumption.

Motor vehicles consume almost 80% of transportation energy or almost one-fifth of all U.S. energy. Automobile fuel usage has grown at an average annual rate of 5% during the last 20 years. If previous patterns continue, daily auto fuel consumption will nearly triple by 1990. As a result of these alarming trends, the Administration has focused considerable attention on reducing fuel consumption by improving automobile fuel economy.

It was with these facts before him that President Ford, back in October of 1974, addressed the issue of improving new car fuel economy. He obtained voluntary commitments from the automobile manufacturers to improve the production weighted average fuel economy of their new cars 40% by 1980.

Achievement of the President's 40% fuel economy improvement goal would have the following beneficial impacts:

Increase the fuel economy of an automobile, which averaged 14.0 mpg in 1974, to 19.6 mpg in the 1980 model year.

Reduce the total amount of projected automobile gasoline consumption in 1980 from 5.65 million barrels of gasoline per day to 5.05 million barrels—a savings of 600,000 barrels of gasoline per day. This gasoline reduction translates into a cost savings of 14.1 million dollars per day (using \$.56/gallon and 1975 dollars).

A 10.6% reduction in imports would occur by 1980. [I would like to provide the Committee, for the record, a table which projects a year by year analysis of how a 40% improvement in automobile fuel economy will affect average mpg, total gasoline consumption, and percent imports needed.]

As a part of the 40% fuel economy improvement program, the Administration has recommended that the Clean Air Act be amended to provide a five year suspension of Automobile standards at the following levels—from 1977 to 1981: 0.9 HC, 9.0 CO, 3.1 NO<sub>x</sub>. The automobile industry assured the President that at these emission levels, the 40% fuel economy goal could be achieved.

Since the Energy Independence Act was submitted for enactment the EPA Administrator has announced the suspension of the 1977 automobile standards for HC and CO, because of a potential health problem associated with catalyst equipped automobiles—sulfuric acid emissions. In addition, the EPA Administrator recommended emission standards for the 1975-1979 model year period—1.5 HC, 15.0 CO, 2.0 NO<sub>x</sub>—which would limit the use of catalysts. For the 1980-81 model years, Mr. Train has recommended the President's proposed standards of 0.9 HC, and 9.0 CO. In addition, Mr. Train indicated that EPA will promulgate a sulfuric acid emission standard for automobiles for the 1979 model year.

We are assessing Mr. Train's recommendation in relation to a 40% fuel economy improvement by 1980. We are hopeful, that at the levels proposed by Mr. Train, the automobile manufacturers will still be able to meet the 40% fuel economy improvement goal. We plan to meet with representatives from DOT and EPA to explore this matter further.

While catalysts allow for re-tuning of the engine, which contributed to the 1975 model year increase in fuel economy, we concur with Mr. Train's findings that the potential exposure of the public to increased sulfuric acid mist may prove to be significant in the long term. We also concur that his proposed standards can be attained by technologies other than the catalyst.

Concurrent with the automobile sulfuric acid problem, two points have been raised relative to the need to limit the sulfur content of gasoline. One is the



possibility of desulfurization of the feedstock, and the other is re-blending of the feedstock, to allow maximum usage of low sulfur content fuels in areas where the sulfuric acid emissions may be the greatest. The economic impacts of desulfurization appear, at this time, to be significant. Preliminary indications are that it would cost the petroleum industry \$4 to \$6 billion to install needed desulfurization equipment. However, we are evaluating both alternatives, and, as yet, do not have a firm position on these proposals.

#### TRANSPORTATION CONTROL PLANS

The administration has proposed an additional amendment that relates to automotive emissions. The proposed amendment, relating to Transportation Control Plans, would provide for extensions that will permit a more realistic approach to the attainment of national primary ambient air quality standards. This amendment would allow the EPA Administrator to extend for the shortest reasonable period—not to exceed 5 years—the deadline for attaining national primary ambient air quality standards. Provision is also made for a second 5-year extension for those communities where the problem is extremely severe. Extensions would be provided to communities only where the community has adopted all reasonable control measures and is still unable to achieve the standards.

At present, the short time span remaining for compliance (1975-77) does not allow for all affected areas to reasonably implement needed control measures. Approximately ten metropolitan areas would be required to take extraordinary measures to control automobile usage, if no deadline extension is granted. Therefore, we believe that the amendment will allow for a more balanced approach to transportation planning.

#### CONCLUSION

Mr. Chairman, FEA has closely examined over the last year the relationship between the Clean Air Act and domestic energy consumption. We believe the changes in the Act cited above are necessary to achieve the energy and environmental goals of the Administration. We welcome the opportunity to provide for the Subcommittee the basis of our positions on these important matters.

At this time, I would be happy to answer any questions you may have.

TABLE: YEAR-BY-YEAR ANALYSIS OF 40-PERCENT FUEL ECONOMY IMPROVEMENT IN AUTOMOBILES

[The following two tables estimate the impact on gasoline consumption and needed imported crude without and with the President's 40-percent fuel economy program. The tables do not reflect the impact of the President's total energy program]

#### WITHOUT PRESIDENT'S PROPOSED 40-PERCENT ECONOMY PROGRAM (BASE CASE)

Year	Average fleet (miles per gallon)	Total gasoline consumption (million barrels per day)	Total imports of crude needed (million barrels per day)
1975.....	13.45	4.83	6.5
1976.....	13.63	4.93	7.3
1977.....	13.85	5.05	8.0
1978.....	14.09	5.29	8.5
1979.....	14.11	5.49	9.1
1980.....	14.16	5.65	9.7

#### WITH PRESIDENT'S PROPOSED 40-PERCENT FUEL ECONOMY PROGRAM

Year	Average fleet (miles per gallon)	Total gasoline consumption (million barrels per day)	Total imports of crude needed (million barrels per day)	Reduction in imports in percent
1975.....	13.70	4.76	6.4	1.5
1976.....	14.06	4.82	7.1	2.2
1977.....	14.47	4.87	7.7	3.6
1978.....	15.03	5.02	8.1	5.1
1979.....	15.63	5.06	7.8	8.4
1980.....	16.25	5.05	8.7	10.6

# THE COSTS AND EFFECTS OF CHRONIC EXPOSURE TO LOW-LEVEL POLLUTANTS IN THE ENVIRONMENT

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HEARINGS  
BEFORE THE  
SUBCOMMITTEE ON THE  
ENVIRONMENT AND THE ATMOSPHERE  
OF THE  
COMMITTEE ON  
SCIENCE AND TECHNOLOGY  
U.S. HOUSE OF REPRESENTATIVES  
NINETY-FOURTH CONGRESS  
FIRST SESSION

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NOVEMBER 7, 10, 11, 12, 13, 14 AND 17, 1975

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[No. 49]

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Printed for the use of the  
Committee on Science and Technology



**STATEMENT OF DR. ROY E. ALBERT, ACTING DEPUTY ADMINISTRATOR FOR HEALTH AND BIOLOGICAL EFFECTS, ENVIRONMENTAL PROTECTION AGENCY; ACCOMPANIED BY DR. JOHN L. BUCKLEY, CONSULTANT, OFFICE OF RESEARCH AND DEVELOPMENT, FORMERLY DEPUTY DIRECTOR FOR PROGRAM INTEGRATION AT EPA**

Dr. ALBERT. Thank you, Mr. Chairman, for inviting me to appear before your subcommittee today.

Accompanying me is John Buckley, who is a consultant to the Office of Research and Development and formerly Deputy Director for Program Integration of that Office.

First, I think it would be appropriate to briefly describe what is meant by chronic low-level pollution effects because they encompass a wide range of responses. Effects of pollution on humans can be roughly divided into three categories—acute, subacute, and chronic.



The so-called "acute" effects result within minutes to days from high levels of pollutant exposure, as for example, chemical pneumonia produced by accidental massive exposure to chlorine gas. Lower levels of protracted exposure can produce "subacute" effects that develop more slowly. For example, inhalation of benzene vapor can produce damage to the blood-forming tissues which becomes evident only after a few weeks or months. From the standpoint of health protection, the acute and subacute effects are relatively easy to guard against because the success or failure of the preventive measures becomes evident very rapidly.

Of primary interest to these hearings, however, are the health effects which can result from sustained exposure to pollutants at lower levels than the above. These "chronic" effects may be of two types, and both are equally hard to detect.

The first class of chronic effects can be a complex of subtle physiological and biochemical reactions that develop promptly and are sustained, but become evident only under stress. For example, healthy young athletes exposed to the Los Angeles type of oxidant smog may show little evidence of respiratory effects while at rest, but the ability to perform heavy athletic exertion at peak effectiveness is diminished. Another example is the impaired resistance of children to respiratory infections, the extent of which appears to be proportional to the levels of sulfate pollution in the air. Further, minor additional impairments of physiological function from pollutant exposure in sick individuals can lead to symptoms such as the higher susceptibility to angina attacks in persons with heart disease who are exposed to carbon monoxide or the aggravated asthmatic response to allergens caused by urban air pollution. These types of responses have been and continue to be the subject of intense quantitative study by EPA.

The second class of low-level chronic pollution effects is quite different because there is no overt evidence of illness or disability, even under stress, for many years. Cancer is an example of such a response where the symptom-free interval between onset of exposure and appearance of the cancer can range from 5 to 40 years depending on the type of cancer and the magnitude of the exposure. There are also other diseases that show long latent periods. Pulmonary fibrosis can occur after many years of chronic exposure to toxic dusts—for example, silica and asbestos—due to the gradual accumulation of diffuse scar tissue in the lung. Emphysema is a form of progressive destruction of the lung which is enhanced by pollutant exposure. Cirrhosis of the liver is another example of a later developing disease which can be caused by many agents such as alcohol, arsenic, carbon tetrachloride, and vinyl chloride; here continual cellular destruction results in scarring and contractures of the liver which lead to eventual liver failure.

All of these conditions are similar in that they are caused by the accumulation of cellular damage with the appearance of overt disease only many years after the onset of exposure; but the mechanisms for the production of the individual disease can be quite different.

The public health importance of the latent effects of chronic toxicant exposure is very great because the conquest of infectious disease in recent decades has put the chronic degenerative diseases such as



arteriosclerosis, cancer and chronic pulmonary disease into the front rank of the principal causes of death. There is very strong evidence that environmental factors play an important role in the causation of cancer and chronic pulmonary disease, and similar evidence is beginning to accumulate for arteriosclerosis.

The EPA has devoted a relatively small proportion of its research efforts to the quantitative characterization of low-level pollutant exposures specifically in relation to the induction of chronic degenerative disease. One important reason for past concentration on other areas is that the time periods allotted to the EPA for the development of standards have almost always been very short. The research program in the EPA has had to be responsive to the regulatory needs of the agency and has, therefore, emphasized studies on short-term effects. Currently, more attention is being paid to this area.

Satisfactory standard setting for low-level chronic pollution exposure depends on an accurate knowledge of dose-response relationships. This can only be obtained by large-scale animal and epidemiological studies. EPA is contributing to the characterization of dose-response relationships with chemical carcinogens by its support of the animal research program at the National Center for Toxicological Research. It is noteworthy that no lifetime animal exposure studies have yet been carried out to determine the dose-response relationships for chronic pulmonary disease with inhalation of air pollutants. While there are chemical and toxicological data, all would agree that there is, unfortunately, a paucity of epidemiological data in this area. These kinds of studies need to be expanded with programs comparable to those supported over the past quarter of a century by the AEC for ionizing radiation. As in the past, EPA will depend heavily on the research contributions to the solutions of these problems that are developed by interaction and collaboration with other Federal agencies.

There is also need for expanded research on another class of toxicant effects caused by chronic low-level exposure to pollutants which is even more subtle than the induction of overt chronic degenerative disease, namely the acceleration of physical deteriorations normally associated with aging. This is a virtually unexplored area of research which may be of comparable social importance to the occurrence of disease at very low levels of pollutant exposure. A common example of such an effect is the premature wrinkling of the skin due to over-exposure to sunlight. This is particularly striking in middle-aged light-skinned women who are fond of sunbathing.

This kind of response cannot be considered as a disease, but it does represent irreparable damage that in many ways stimulates premature aging. It is very likely that similar effects take place in internal organs with the induction of an accelerated decline in functional capacity associated with aging. This effect has, in fact, been shown to occur in the lung with cigarette smoking. It would be important, for example, to determine whether toxicants which are known to cause acute brain damage such as lead, mercury and various solvents, also cause an acceleration in the loss of brain cells normally associated with aging and whether such an effect contributes to the development of senility and other less severe losses of mental function in older individuals.

From the standpoint of a detailed understanding of mechanisms at the cellular, tissue and whole organism levels combined with extensive quantitative animal and epidemiological data, the field of ionizing radiation is far ahead of chemical toxicology with respect to developing an adequate data base for regulating chronic low-level pollution. However, the problem with chemicals is far more complex and will require decades of sustained, high quality and adequately supported research to achieve a comparable level of understanding as currently exists for ionizing radiation. This effort should involve not only large-scale quantitative animal and epidemiological studies, but a balanced program involving the clarification of underlying mechanisms of injury since the dose-response data, particularly at the low-effect levels needs to be interpreted in light of an understanding of basic mechanisms of action.

# IMPLEMENTATION OF THE CLEAN AIR ACT—1975

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HEARINGS  
BEFORE THE  
SUBCOMMITTEE ON  
ENVIRONMENTAL POLLUTION  
OF THE  
COMMITTEE ON PUBLIC WORKS  
UNITED STATES SENATE  
NINETY-FOURTH CONGRESS

FIRST SESSION

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MAY 13, 14, AND 15, 1975

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SERIAL NO. 94-H10

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PART 3  
AUTOMOBILE EMISSIONS

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Printed for the use of the Committee on Public Works



STATEMENTS OF DR. DELBERT S. BARTH, ACTING DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF HEALTH AND ECOLOGICAL EFFECTS, ENVIRONMENTAL PROTECTION AGENCY; DR. BERNARD J. STEIGERWALD, DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF AIR QUALITY PLANNING AND STANDARDS, ENVIRONMENTAL PROTECTION AGENCY, AND DR. EDGAR STEPHENS, PROFESSOR OF ENVIRONMENTAL HEALTH AND SCIENCE, STATEWIDE AIR POLLUTION RESEARCH CENTER, UNIVERSITY OF CALIFORNIA, RIVERSIDE, CALIF.

Dr. BARTH. Thank you, Mr. Chairman. The testimony which I will present has been prepared jointly by my colleague, Dr. Steigerwald, and myself. The title which we have put on this testimony is "Relating Emissions From Motor Vehicles to Air Quality."

I appreciate the opportunity to discuss with this committee the techniques and problems involved in relating emissions to air quality concentrations, specifically in relation to the analysis of the various alternative emission standards for light duty vehicles [LDV]. As I am sure you realize, the relationship between emissions and air quality is highly complex, especially for reactive pollutants such as hydrocarbons and nitrogen oxides, and depends on a number of meteorological factors, the location of sources, emission height, terrain factors, and the nature and reactivity of the pollutants themselves.



Because of the problems in simulating the interaction of all these variables, the proportional model or rollback technique is often used to analyze the impact of alternative control strategies. The rollback technique assumes that changes in emissions affect observed air quality concentrations in direct proportion to the magnitude of the emission change.

For carbon monoxide [CO], it is well known that air quality is highly dependent on the activity on nearby roadways and that sources further away contribute only minor amounts at that receptor even though the emissions from the more distant sources may be just as large as those on the nearby roadway. Therefore, the impact of a control strategy which controls emissions more in one location than in another—for example, limiting traffic on specific streets—is not accurately simulated by a rollback analysis. However, a control strategy which restricts emissions uniformly over an area, as is the case with changing vehicle emission standards, should be reasonably simulated by rollback.

Because of the time needed for the precursors of photochemical oxidants— $O_x$ —and nitrogen dioxide— $NO_2$ —to react in the atmosphere, violations of the national standards for these pollutants tend to be areawide in nature rather than highly localized as is the case for CO. Although this tends to reduce the error in projecting air quality impacts that might result by simulating emission control in one location more than in another—for example, mobile sources versus stationary sources—the complexities of the atmospheric reaction itself make air quality predictions for  $O_x$  and  $NO_2$  less certain than for CO.

Attempts are being made to develop computerized atmospheric simulation models to replace rollback calculations in determining air quality—emissions relationships.

EPA has developed several first-generation models and is now evaluating further the most promising of these. However, these first generation models have severe limitations concerned with the precise identification of pollutant emissions which are reactive, the chemical reactions simulated, limits on the time period which is simulated and the fact that the concentrations are area averages rather than site specific. Their practical application would require a detailed emission and meteorological data base far beyond what is available in most cities.

A feasibility study to determine the applicability of these models for motor vehicle emission strategy evaluation has just been completed for the Los Angeles area; this is the only area for which an adequate data base is available. Although the results are promising it is clear that it will be several years before such models are available for routine strategy analysis.

I would like now to discuss briefly the use that has been made of the rollback technique in calculating needed automotive emission limits. One of the earliest applications was published in August 1970—*Journal of the Air Pollution Control Association*—and I believe it provided significant guidance to this committee in selecting the automotive standards contained in the Clean Air Act of 1970.

Although ambient air quality standards were not yet available the national air quality goals used as targets in the 1970 analysis were similar to the current standards—identical for CO; for oxidant,

0.06 part per million versus 0.08 part per million, 1-h concentration not to be exceeded more than once per year; and for  $\text{NO}_2$ , 0.1 part per million maximum 1-h concentration, versus 0.05 part per million, annual average which is the present standard.—Air quality data were not available in most cities in 1970, but the air quality for the worst case situations that provided the basis for the calculations generally is representative of the worst case today.

An exception is for  $\text{NO}_2$ ; errors in the monitoring method used in 1970 indicated the  $\text{NO}_2$  air quality data to be significantly higher than more recent measurements. The 1970 calculation assumed a uniform 5-percent growth rate for all source categories—light-, medium- and heavy-duty vehicles and all stationary sources.

More importantly the rollback calculations assumed a uniform percent control for all source categories. This led to the conclusion that the air quality goals could be achieved in 1980 if all sources—note when I say all sources I mean all mobile and stationary sources of each of these pollutants—if all sources achieve significant reductions in emissions by that time—93 percent for CO, 94 percent for  $\text{NO}_x$ , and 99 percent for hydrocarbons.

Since stationary sources and other vehicles make up a substantial portion of the emissions of hydrocarbons and oxides of nitrogen it is clear that 90-percent control of light duty vehicles alone would not achieve the emission reduction needed to meet the air quality goals in 1980.

Since 1970, a variety of improvements in the rollback model have evolved until we now have sufficient capability to differentiate between the impact that emissions from various types of sources will have on future air quality.

The model recognizes six separate major source categories: Light-, medium-, and heavy-duty vehicles, powerplants, industrial sources, and area sources. It allows growth rates, replacement rates, and degree of control to be varied annually for each source category. It is the most sophisticated model now available for general use with reactive pollutants and has been used extensively for analyzing the future impact of alternative emission control strategies.

Recently a comprehensive analysis of emission control alternatives and their impact for a large number of cities was completed to assist the administrator in his suspension decision. A copy of this report will be submitted for the record. This report is entitled "Air Quality Impact of Alternative Emission Standards for Light Duty Vehicles." It was revised March 12, 1975. [The report referred to may be found at p. 57.]

In it we used air quality and emission inventories specific to each city. Separate and realistic control assumptions were used for each category of stationary source and for heavy and medium duty vehicles. These were varied periodically throughout the projection period to simulate the impact of anticipated State and Federal control regulations such as new source performance standards.

A factor which strongly influences the results of any projection of automotive pollution is the growth rate in vehicle miles traveled [VMT]. Because carbon monoxide is essentially a problem near

heavily traveled streets nearing saturation, we have based the VMT growth rate for CO on historical central business district data, generally 1 to 3 percent per year.

On the other hand, oxidant and nitrogen dioxide concentrations are not only influenced by emissions within the central business district, but also by transport of hydrocarbons and nitrogen oxides from the surrounding faster growing areas. Therefore, the analysis used a VMT growth rate for these latter pollutants based on expected VMT growth for the entire metropolitan area, generally between 2 and 6 percent.

I have provided a summary of the results of this recent analysis in tabular form, which I believe will assist in displaying the most pertinent differences in the two standards for light-duty vehicles that I will be discussing. These are the present statutory standards as determined by the Energy Supply and Environmental Coordination Act and the standards recently discussed by the Administrator in his suspension decision for consideration, in view of the sulfuric acid mist emissions problem.

We examined 30 air quality control regions for projected concentrations of oxidants through 1985. Our analysis projects that under the statutory standards, all cities will experience a reduction in oxidant concentrations with an average reduction of 21 percent by 1980 and 33 percent by 1985.

However, of the 30 areas examined, 29 are projected to be above the oxidant standard in 1980 and 23 in 1985. Under the alternative set of standards discussed by the Administrator, the average improvement in air quality for the 30 cities is 19 percent in 1980 and 30 percent in 1985. The number of areas which remain above the oxidant standard in 1980 and 1985 are the same as under the statutory standards.

We examined 26 cities which were above the ambient standard for CO in recent years. The projections indicate that under the statutory standards, the 26 cities examined will experience an average of 74 percent reduction in CO concentrations and that by 1985 only 5 of the 26 will still be above the standard.

Under the standards discussed by the Administrator, CO emissions will be reduced, on the average, by 70 percent by 1985 and the number of cities above the ambient standard will be the same as for the statutory standard. The improvement in projected CO air quality results because CO problems are almost uniquely associated with motor vehicles; therefore, the growth of stationary sources over the next 10 years will have little effect on CO air quality.

Ten cities were selected for the NO<sub>2</sub> analysis representing the worst combinations of air quality and growth potential. Unlike the projections for oxidant and carbon monoxide, the average NO<sub>2</sub> levels are projected to increase over the next 10 years. Under all LDV standards evaluated, 9 of the 10 cities examined are projected to be above ambient NO<sub>2</sub> standards in 1985. The anticipated sharp increase in NO<sub>x</sub> emission from the growth of stationary sources will not allow the air quality standards to be met solely by control of automotive emissions.

It is difficult to summarize adequately a subject as complex as the relationship between future emissions and projected air quality.



We will be pleased to answer any questions or submit for the record more detailed information.

In the table which is attached to our statement you can see that we are summarizing 30 pieces of information and have provided in the footnotes the various assumptions that have been made with regard to standards which would be in effect.

[The table attached to Dr. Barth's statement follows:]

TABLE 1.—IMPACT OF ALTERNATIVE LDV EMISSION STANDARDS

Pollutant	LDV emission standard	Average percent change from 1970 air quality		Number of cities above standard/total cities analyzed		Average percent of total emissions due to LDV		
		1980	1985	1980	1985	1970	1980	1985
Hydrocarbon/oxidant..	Present statutory <sup>1</sup> .....	—21	—33	29/30	23/30	47	36	25
	Standards discussed by administrator <sup>2</sup>	—19	—30	29/30	23/30	47	38	28
Carbon monoxide.....	Present statutory <sup>3</sup> .....	—57	—74	14/26	5/26	73	56	37
	Standards discussed by administrator <sup>4</sup>	—54	—70	14/26	5/26	73	60	42
Nitrogen oxides.....	Present statutory <sup>5</sup> .....	+12	+16	8/10	9/10	32	23	11
	Standards discussed by administrator <sup>6</sup>	+18	+23	9/10	9/10	32	27	16

<sup>1</sup> 0.41 g/mi 1977 on.

<sup>2</sup> 1.5 g/mi 1977–79; 0.9 g/mi 1980–81 0.41 g/mi 1982 on.

<sup>3</sup> 3.4 g/mi 1977 on.

<sup>4</sup> 15 g/mi 1977–79; 9.0 g/mi 1980–81; 3.4 g/mi 1982 on.

<sup>5</sup> 0.4 g/mi 1978 on.

<sup>6</sup> 2.0 g/mi 1977–81; 0.4 g/mi 1982 on.

Dr. BARTH. I call your attention to the last column which is entitled "Average Percent of Total Emissions Due to Light Duty Vehicles." You can see that for the hydrocarbon oxidant standard which is in the first row with the present statutory standards, for example, the average percent of total emissions due to light duty vehicles in 1970 was 47 percent. If the present statutory standards are put into effect on schedule that would be 36 percent in 1980 and 25 percent in 1985.

Notice that for the standards discussed by the Administrator, which are given in footnote 2, those same numbers are close. In 1970, the same number, 47 percent; in 1980 it would be 38 percent instead of 36 percent; in 1985, 28 percent instead of 25 percent. Similarly the other results are depicted in the table. We would be happy to respond to any questions which you may have.

Senator MUSKIE. Thank you very much, Mr. Barth. That covers the testimony of two. Why don't we hear the other witness, Dr. Stephens? Then we will open it up for questions.



# AUTOMOBILE FUEL ECONOMY AND RESEARCH AND DEVELOPMENT

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## HEARINGS BEFORE THE COMMITTEE ON COMMERCE UNITED STATES SENATE NINETY-FOURTH CONGRESS FIRST SESSION ON S. 307, S. 499, S. 633, and Amendment 15, S. 654, and S. 783 MISCELLANEOUS FUEL ECONOMY BILLS

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MARCH 12 AND 13, 1975

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Serial No. 94-8

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Printed for the use of the Committee on Commerce



STATEMENT OF HON. ROGER STRELOW, ASSISTANT ADMINISTRATOR FOR AIR AND WASTE MANAGEMENT, ENVIRONMENTAL PROTECTION AGENCY; ACCOMPANIED BY ERIC O. STORK, DEPUTY ASSISTANT ADMINISTRATOR FOR MOBILE SOURCE AIR POLLUTION CONTROL

Mr. STRELOW. Thank you, Mr. Chairman. I have a very brief statement.

I appreciate the opportunity to appear before you today to discuss with you proposals before this committee on automobile fuel economy.

I am accompanied by Mr. Eric O. Stork, Deputy Assistant Administrator, who can assist with questions of a technical nature the Committee may have.

The question of motor vehicle fuel economy has been a concern of EPA for some time. Our work with motor vehicle emission control over the years made us very much aware of the fuel economy issue.

With the arrival of the energy emergency, our earlier work in fuel economy began to pay dividends. We were ready with a great deal of fuel economy data when a public, newly aware of energy conservation, needed it and wanted it.

EPA, in cooperation with DOT, forwarded to the Congress last December, a report entitled "Potential for Motor Vehicle Fuel Economy Improvement." It is obvious your committee is well familiar with this report.

This report examined fuel economy potentials and concluded that substantial improvements are feasible by 1980.

The President, as a part of his comprehensive energy program, has called for a concentrated effort to insure that the fuel economy of automobiles improves by 40 percent in 1980 over the 1974 model year level. This effort has a high priority within the administration and we are hopeful that such improved fuel economy can be achieved with the voluntary program now underway.

However, if the commitments made by the automobile manufacturers to Secretary Morton do not result in clear and adequate progress in meeting the President's goals, a mandatory program will be appropriate.

The DOT will be monitoring progress periodically. EPA expects to assist DOT through our ongoing fuel economy measurement program which we initiated in the 1973 model year.

Since that time, we have been publishing for the public the fuel economy performance results for various models, and have been working on a larger program with the manufacturers. FEA has joined with us in that effort so as to give it even greater public exposure.

We believe that any fuel economy improvement program—whether it be voluntary or mandatory—must clearly recognize the relationship between auto fuel economy and air pollution controls.

During the recent EPA hearings on applications of the auto manufacturers for a 1-year suspension of the hydrocarbon (HC) and carbon

monoxide (CO) emission standards, we reviewed in depth the problems concerning emission control, fuel economy, and their interrelationship. On the basis of those hearings, the Administrator determined that neither the interim standards established in his decision to grant the suspension for the 1977 model year, nor the recommended standards through the 1981 model year would adversely impact the fuel economy improvements previously identified in the EPA/DOT joint study.

I would like to reiterate the fact that the basis for the suspension decision, as the Administrator clearly stated, was entirely a matter of public health concern about sulfuric acid emissions. The suspension decision itself was not related to fuel economy.

Thus, in our view, the feasibility of achieving the President's goal for a 1980 fuel economy improvement of 40 percent is not altered by our suspension decision or recommendations.

As you may know, our suspension decision and recommendations involve less stringent HC and CO standards for the 1977 to 1979 model years than those originally recommended by the President. However, our recommendations involve a more stringent nitrogen oxide (NOx) standard for the 1977 to 1981 model years and a new sulfuric acid aerosol ( $H_2SO_4$ ) standard in the 1979 model year.

When attention is focused on the post-1981 model years, difficulties arise in predicting the cumulative effect of future standards and technology. To the extent that any fuel economy program establishes fuel economy goals for the post-1981 model years, uncertainties about emission control systems likely to be utilized during that time would argue for flexibility in the administrative bodies involved to accommodate new developments.

We believe that any fuel economy improvement program—whether it be voluntary or mandatory—would be best served if it uses the EPA fuel economy test procedure to determine fuel economy performance. The President's program and all the bills before the committee contemplate such an approach. The Government, industry, and the public have all come to rely upon the validity of the EPA test procedure for measuring fuel economy.

I am sure the committee is familiar with the GAO study of this procedure. This report indicated it was an effective and reasonable means for measuring fuel economy. Further, I believe our procedures turned out to be something on the order of 20 times cheaper than it could be done elsewhere in the Government simply because our fuel economy measurements are a spinoff of the emission testing that we must do in any event.

Calculating fuel economy from that adds very little additional cost. This procedure has the merit of economy and efficiency in that it provides simultaneous data on fuel economy and exhaust emissions. This is essential from a substantive point as well. In order to make sure you are getting a valid measurement of the cars' fuel economy, you must either simultaneously or sequentially test the cars for emissions to make sure the fuel economy performance you are getting has not been achieved by sacrificing the emission control standards. Of course, it is not legal to sell a car that is not meeting the emission control standards.

Mr. Stork and I will be pleased to answer any questions the committee may have. ]

✓ ADDITIONAL QUESTIONS FOR MR. ROGER STRELOW

1. It has been suggested that mandating new car fuel economy standards, such as those incorporated in S. 633, will drive American consumers into the hands of foreign producers. This implies an inability of U.S. automakers to compete. Is it your opinion that Detroit will not be able to compete with foreign manufacturers in the event that meaningful fuel economy legislation is passed?

2. Table 10 of the October 24, 1974 DOT/EPA report to the Congress states that a 43% gain in average new car fuel economy (i.e., 20 miles per gallon) should be possible by model year 1980, under the following assumptions: (a) emission standards as stated in footnote 1 on pages 8 and 9 of the DOT/EPA report; and (b) minimal sales mix shift from current levels. Table 10 also states that a 63% fuel economy gain (i.e., 22.8 miles per gallon) is possible in 1980, if the sales mix shifts to the levels assumed in scenario D of the DOT/EPA report.

Do you agree that the above statements are an accurate reflection of the information contained in Table 10? If so, does your agency still stand by the conclusions of this report? If not, why not?

3. At his March 5, 1975 news conference, Administrator Train recommended emission standards for 1976-1981 that are more lenient than those assumed in footnote 1 of the above-mentioned DOT/EPA report. Does this imply that fuel economy gains greater than those listed in Table 10 of the DOT/EPA report should be possible by model year 1980?

U.S. ENVIRONMENTAL PROTECTION AGENCY,  
OFFICE OF THE ADMINISTRATOR,  
Washington, D.C., April 3, 1975.

Hon. WARREN G. MAGNUSON,  
Chairman, Committee on Commerce,  
U.S. Senate,  
Washington, D.C.

DEAR MR. CHAIRMAN: In your March 19, 1975 letter you requested the Environmental Protection Agency's response to certain questions related to your March 12, 1975 auto fuel economy hearing. Attached is our response to those questions.

If I can be of further assistance, please let me know.

Sincerely yours,

ROGER STRELOW,  
Assistant Administrator for Air and Waste Management.

Enclosures.

Answer 1. The domestic automobile industry has always been able to compete successfully in those markets where it perceived an adequate demand for a new model or where competition (primarily foreign) dictated that it offer new models in a market where no domestic models had previously been offered. An example of the latter case is the introduction of the Pinto and Vega subcompacts as a result of increasing foreign small-car market incursion in the late 1960's and early 70's.

However, the recent economic downturn and resultant slump in new-car sales seems to have affected imports somewhat less than the domestic models. Imported cars have climbed to 22 percent of the total market in February 1975, from a consistent 15 percent prior to the oil embargo in 1973. Even during the embargo, when small cars were at a premium and dominated the market, imports were only at a high of 18 percent of the U.S. market. In addition, import sales in February



of 1975 were 29 percent above sales in February 1974. Thus, even while the domestic manufacturers were offering rebates to spur sales, imports gained at the expense of U.S. models. Although no thorough analysis has been undertaken to understand the reasons for the penetration of imports, it is probably due to four factors: (1) the imports' relatively lower prices than domestic models; (2) their somewhat better fuel economy; (3) the greater diversity of foreign models offered in the lower price, better fuel economy spectrum of the market; and (4) possibly greater buyer interest generated by new models introduced by several foreign manufacturers, most notably Volkswagen.

Within the next year, there is little action the domestic manufacturers can take to overcome the advantages of foreign manufacturers in the small car market outlined above. Price cutting, such as in the recent rebate program and subsequent introduction of low-frill models, is the major tactic being used now by the domestic manufacturers to overcome buyer apathy, and as the February sales figures show, even that doesn't seem to stop the penetration of imports. Any action that would penalize cars with higher cost of poorer fuel economy would tend to exacerbate this problem.

Subsequent to the 1976 model year cars, the domestic manufacturers should begin to reduce their disadvantages as they introduce new and smaller cars across their model line. General Motors, for instance, intends to begin producing a "mini-car" in mid-1976 which will be somewhat smaller than the current Vega. GM has also indicated that it will substantially reduce the size and weight of all its cars by 1978 in order to improve their average fuel economy. Chrysler and Ford have also indicated their plans to reduce the weight of their cars and to improve overall fuel efficiency by 1980. Ford, for instance, may reduce the weight of its luxury, standard and intermediate models 1,000 pounds by the 1980 model year. All of these long-term changes should improve the competitive position of the domestic manufacturers relative to the imports by 1980.

A fuel economy regulatory program such as that described in S. 633, should not radically affect the competitive position of the domestic manufacturers if the ultimate fuel economy standards chosen for 1980 and subsequent years are technologically attainable and if the standards are applied equitably to both domestic and foreign manufacturers. The Administrator's recommendation to Congress on interim emission standards for 1978-1981 model year cars considered the effect of the emission standards on the ability of the auto industry to achieve a 40% gain in fuel economy by 1980. It concluded that the 40% goal was achievable at the 0.9/9.0/9.0 GMS/MI levels for HC/CO/NOx.

As for any anti-competitive effects of fuel economy regulations on domestic manufacturers, we feel that as long as no excessively stringent standards are set in the short-term, e.g. for 1975-78 model years, the domestic manufacturers should be able to shift model designs and production volume enough to meet any reasonable standard. However, if a very ambitious fuel economy improvement standard or tax is set for 1975-1977 model years, it is unlikely that the domestic manufacturers could shift production and introduce new, more fuel-efficient models enough to provide a sufficient number of models to compensate for the diversity of foreign competition with its established line of more fuel-efficient models. The earliest plans to introduce many more fuel-efficient models are for the 1976 and 1977 model years. Hence, it is likely that domestic manufacturers would continue to have a slight competitive disadvantage in the more fuel-efficient, lower price range line of cars. In January 1975, for instance, approximately 75 percent of the cars sold with fuel economy greater than 20 miles per gallon were imports. Thus, for the short-term we agree that the passage of "meaningful fuel economy legislation" could possibly adversely affect the domestic auto industry's competitive position if such legislation affected the 1975-1977 model years. In the longer term, however, we believe the domestic auto industry has enough innovation and resilience to compete successfully with anyone.

Answer 2. The above statements are accurate, and EPA continues to affirm the conclusions of the report that a fuel economy increase of approximately 20 to 60 percent is possible by 1980 over that in 1974 depending on what strategy is followed by the manufacturers in improving the fuel economy of the 1980 new car fleet.

Answer 3. No substantial gains in fuel economy could be made by the recommended temporary relaxation of the emission standards over those projected in the EPA/DOT study. The reason for recommending emission levels of 0.9/9/2.0 for 1980-81 was not because this could provide better fuel economy, but rather because at these levels it would be possible to achieve about the same fuel economy (using 91 RON gasoline) either with catalytic emission control or with lean burn engines that do not require catalysts. Going significantly below the 0.9/9/2.0 level without using catalysts would tend, at least in the 1980-81 timeframe, to reduce fuel economy significantly. Thus the 0.9/9/2.0 level was recommended because it is not currently clear whether catalysts will be able to be used after 1979, in which year a sulfuric acid emission standards will take effect.

A slight gain in fuel economy (of about 3-5%) may be possible under the Administrator's recommendation compared to the statutory case for 1980 due to the possible use of higher compression on engines operating on leaded gasoline. An analysis of these questions made subsequent to the suspension hearings, while consistent with the emissions and fuel economy tradeoffs discussed in the EPA/DOT study, updates these matters and is enclosed.

# IMPLEMENTATION OF THE CLEAN AIR ACT—1975

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HEARINGS  
BEFORE THE  
SUBCOMMITTEE ON  
ENVIRONMENTAL POLLUTION  
OF THE  
COMMITTEE ON PUBLIC WORKS  
UNITED STATES SENATE  
NINETY-FOURTH CONGRESS  
FIRST SESSION

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MAY 20 AND 21, 1975

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SERIAL NO. 94-H10

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PART 4  
AUTOMOBILE EMISSIONS

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Printed for the use of the Committee on Public Works



## IMPLEMENTATION OF THE CLEAN AIR ACT—1975

WEDNESDAY, MAY 21, 1975

U.S. SENATE,  
COMMITTEE ON PUBLIC WORKS,  
SUBCOMMITTEE ON ENVIRONMENTAL POLLUTION,  
*Washington, D.C.*

The subcommittee met at 10 a.m., pursuant to recess, in room 6226, Dirksen Senate Office Building, Hon. Edmund S. Muskie (chairman of the subcommittee) presiding.

Present: Senators Muskie, Culver, Hart, Buckley, and Domenici.  
Senator MUSKIE. The committee will be in order.

This is the last in a series of hearings which we have held on the Clean Air Act on the issues proposed, proposals to amend it and the problems which have been placed under it and it is appropriate that we should conclude this series of hearings by hearing the testimony of the Administrator of the Environmental Protection Agency, Mr. Russell Train.

I hope he has had an opportunity to examine at least the principal points that have been made by witnesses in these hearings. I don't know that we could cover them all by questions, but it would certainly be useful.

With that, may I welcome him once again to this subcommittee and invite you, Russell, to present your testimony.

STATEMENT OF HON. RUSSELL E. TRAIN, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY DR. WILSON TALLEY, ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT; ROGER STRELOW, ASSISTANT ADMINISTRATOR FOR AIR AND WASTE MANAGEMENT, AND ERIC STORK, DEPUTY ASSISTANT ADMINISTRATOR FOR MOBILE SOURCE POLLUTION

Mr. TRAIN. Thank you, Mr. Chairman.

Mr. Chairman, I welcome this opportunity to discuss with you motor vehicle emission standards set under title II of the Clean Air Act.

Before I proceed beyond that, let me just say that I have made available to the committee a four-page staff document entitled "A Summary of Technological Options for Emission Control."

There have been so many variations suggested that it seemed worthwhile to take a shot at setting them down in rather summary form with brief conclusions as to fuel economy, impact on sulfate levels, economic costs and technological availability.



## PROPOSED STANDARDS

	Present law			Train's delay granted			Train's recommendations			President Ford's proposal			California			Auto companies		
	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO	NO <sub>x</sub>
1975-76	1.5	15.0	3.1	1.5	15	3.1	-----	-----	-----	1.5	15.0	3.1	0.9	9	2.0	1.5	15	3.1
1977	.41	3.4	2.0	1.5	15	2.0	-----	-----	-----	1.5	15.0	3.1	.41	9	1.5	1.5	15	3.1
1978	.41	3.4	.4	-----	-----	-----	1.5	15.0	2.0	.9	9.0	3.1	-----	-----	-----	1.5	15	3.1
1979	-----	-----	-----	-----	-----	-----	1.5	15.0	2.0	.9	9.0	3.1	-----	-----	-----	1.5	15	3.1
1980	-----	-----	-----	-----	-----	-----	.9	9.0	2.0	.9	9.0	3.1	-----	-----	-----	1.5	15	3.1
1981	-----	-----	-----	-----	-----	-----	.9	9.0	2.0	.9	9.0	3.1	-----	-----	-----	1.5	15	3.1
1982	-----	-----	-----	-----	-----	-----	.41	3.4	2.0	.41	3.4	3.1	-----	-----	-----	(1)	(1)	(1)

1 Unknown.

Senator MUSKIE. I also have before me a one-page undated document which is described as "EPA Waiver of Federal Preemption to Allow California to Enforce More Stringent 1977 Automobile Emission Standards."

Has that just been issued?

Mr. TRAIN. I made the decision to grant the waiver last evening. We issued a press release. I have a copy of the press release here. Whether that is it, it is about the same length.

Senator MUSKIE. It looks like it. I will include that in the record, also.

[The press release follows:]

#### EPA ALLOWS CALIFORNIA TO ENFORCE MORE STRINGENT 1977 AUTOMOBILE EMISSION STANDARDS

California's request to set automobile emission standards for 1977 automobiles that are more stringent than Federal requirements for cars elsewhere in the country has been granted by Environmental Protection Agency Administrator Russell E. Train.

This action will allow California for 1977 model year automobiles to enforce automobile exhaust emission standards of .41 grams per mile (gpm) hydrocarbons (HC), 9.0 gpm carbon monoxide (CO), and 1.5 gpm oxides of nitrogen (NO<sub>x</sub>). The comparable 1977 Federal standards are 1.5 gpm HC, 15 gpm CO, and 2.0 gpm NO<sub>x</sub>.

In March 1975, the California Air Resources Board formally requested the waiver of Federal standards preemption provision of Section 209(a) of the Clean Air Act.

A public hearing was held on April 29 in Los Angeles to consider California's request to implement more stringent standards. From the findings of that hearing and the other information available to him, the Administrator concluded that (1) compelling and extraordinary air pollution conditions exist in California and (2) adequate technology and lead time exist for the automobile manufacturers to meet the proposed standards. He therefore concluded that under Section 209 of the Clean Air Act he is compelled to grant the requested waiver.

A notice of the decision will appear soon in the Federal Register. Copies of the decision are available in the Freedom of Information Center, Room 206, West Tower, 401 M Street, SW., Washington, D.C.

[The text of the California waiver decision may be found at p. 1378.]

Mr. TRAIN. Mr. Chairman, I will, with your permission, then proceed.

EPA has issued air quality standards for six pervasive air pollutants. The air quality problems of four of these pollutants, carbon monoxide, hydrocarbons, nitrogen dioxide, and photochemical oxidants, have been in large measure a result of pollution from mobile sources.

Control over automotive emissions is therefore fundamental to the attainment of ambient air quality which is protective of public health. Air quality for hydrocarbons and carbon monoxide has improved over the course of the last few years.

At the direction of this committee last year, the National Academy of Sciences reviewed the automotive related air quality standards and concluded that the air quality standards were generally adequate to protect public health although they expressed concern with respect to oxidants and nitrogen dioxide as to whether there was a true threshold below which no health effects occurred and considered it desirable to have a short-term nitrogen dioxide standard in addition to the annual average.

The National Academy of Sciences also expressed a need for additional research on health effects to consider the interaction of pollutants since the Academy was not satisfied with the data base currently

available for setting standards. That is with particular reference to the question of interaction, the synergistic effect of the various pollutants.

The 1970 amendments to the act mandated a 90-percent reduction in hydrocarbon, carbon monoxide, and nitrogen oxide emissions from those allowed for hydrocarbon and carbon monoxide and from the measured emissions from 1971 model year cars for nitrogen oxide.

Administrative and legislative actions have now made these requirements effective with 1978 model year light-duty vehicles.

In testimony before this committee, Dr. Delbert Barth and Dr. Bernard J. Steigerwald, both of EPA, reviewed the methodology for relating auto emissions to air quality; and I think I can fairly state that although motor vehicle controls may not, in and of themselves, assure the attainment and maintenance of ambient air quality standards, stringent controls are a vital factor in overall control efforts to do so.

Although the specific statutory requirements have been deferred as a result of both legislative and administrative actions, I think it important to note that real progress has been made since 1968, when motor vehicle emission standards were first applied.

Currently, 1975 Federal standards require an 83-percent hydrocarbon, 83-percent carbon monoxide, and 11-percent nitrogen oxide reduction from precontrolled cars.

Compared to the 1970-71 models upon which the statutory 90-percent reduction required by Congress is measured, and which had higher nitrogen oxide emissions than did precontrolled cars, the progress is 63, 56, and 38 percent respectively.

Thus, we have come a long way, but still have a considerable way to go to meet the statutory standards. Moreover, autos in use often fail to meet standards because of inadequate maintenance.

In 1973, EPA granted its first suspension of the statutory standards for hydrocarbon and carbon monoxide. At that time, although it was our belief that such standards could be met through catalyst technology, EPA considered it unwise to mandate an untried technology nationwide. We set interim standards which, in our judgment, would have required catalysts in California but not nationwide.

However, industry adopted this technology on almost all models. Their reasons for so doing included a recognition of the major fuel economy gains that catalyst technology would permit. I shall say more on this subject later in this statement.

By March 5, 1975, decision on the automobile manufacturers' request for a suspension of the 1977 hydrocarbon and carbon monoxide emission standard rested squarely on the potential public health problems resulting from the wide-scale introduction of the catalytic converter.

The best information available to me during the 60-day suspension proceeding suggested that sulfuric acid emissions from catalyst-equipped cars could in a few years pose a localized public health problem in the vicinity of heavily traveled freeways.

My decision to grant the manufacturers' request for a suspension was based solely on this consideration. Prudence dictated caution in not exposing the public to unacceptable levels of a pollutant which possibly could prove more dangerous than those being controlled.



During the proceedings, we found that oxidation catalyst technology to meet the hydrocarbon and carbon monoxide statutory standards was available.

The oxidation catalyst also offers major fuel economy benefits because it allows design of the engine to focus on optimizing fuel economy and performance rather than on minimizing pollution.

Other promising technologies, such as "lean burn" systems, the Dresser carburetor, and the three-way catalyst are not developed to the point where they can be industrywide to meet statutory standards by 1977.

Our tests indicate that these systems are expected to result in lower levels of sulfuric acid mist over that associated with catalyst-equipped vehicles.

There is considerable controversy on the extent of buildup of sulfuric acid emissions and resulting health effects from catalysts in light of our known need to control hydrocarbons and carbon monoxide. We are attempting to answer the questions posed by this problem.

Some of the questions raised by the issue are (1) the modeling techniques designed to predict ambient concentrations; (2) emission rates from various types of catalysts under various driving modes; (3) the levels at which adverse health effects occur or preexisting medical conditions are aggravated; and (4) control options such as catalyst modifications or reformulations, desulfurization and allocation of low-sulfur gasolines to the unleaded pool.

It is clear to me we must take positive action to limit the allowable emissions of sulfuric acid from the automobile tailpipe.

In my suspension decision, I announced that I would promulgate a sulfuric acid standard. I explained that establishing a numerical emission level for sulfuric acid would be extremely difficult, not only because of the problem involved in measuring that elusive pollutant but also because of the lack of knowledge that would permit the establishment of a "safe" ambient level of sulfuric acid or related sulfates.

Our staff immediately began work developing a sulfuric acid emission standard. I must admit that in March I was more optimistic about how quickly we could do that than was warranted, for at that time I said we would propose a standard within 2 months.

I believe I said I hope we would do so in 2 months. I have learned in this business to qualify predictions of that sort.

It is now clear that the earliest we can propose such a standard is in November of this year. The reason for the delay is that whereas all of the previous vehicle emission testing for sulfuric acid had been done with a variety of experimental methods—for a regulatory standard, we must have a precisely defined test procedure.

We expect to complete development of that test procedure, and have it validated, by the middle of July. We expected to have completed testing catalyst-equipped cars as well as cars with other types of engines using this new test procedure by the end of August. Then we will have to bring all this together with currently ongoing analyses of air quality concentrations and their public health implications.

We will then develop our recommended regulations, coordinate the draft regulations with other interested Federal agencies, and finally, propose it in the Federal Register. To insure that the industry has enough leadtime to comply with an emission standard in the 1979



model year, for which cars begin testing a little over 2 years from now, we are making all of our data on the development of the test procedure and on related technical issues available to the industry and others as we go along. In fact, tomorrow afternoon, we are having another in a series of technical meetings on this issue with the industry, at our laboratory in Ann Arbor.

As I have noted, the problems of setting a sulfuric acid emission standard is particularly complicated by the difficulty in estimating ambient concentrations of sulfuric acid at which health effects occur. The suspension decision record provided some estimates of the air quality impact of sulfuric acid based upon emission rates and vehicle concentrations. We are continuing to develop modeling approaches to sulfuric acid emissions in order to indicate a range of possibilities which would be more typical of actual adverse exposure situations.

There is relatively little epidemiological information on sulfuric acid ambient health effect implications. There does exist an occupational health standard which we are reviewing to determine the degree to which it can be extrapolated to an ambient air reference standard. Likewise, we have developed information in our CHESS studies on the general problem of sulfates in the air.

We are attempting to refine this information. These activities, along with the development of better information on emissions from light-duty vehicles, should result in a solid data base for a specific recommendation on a sulfuric acid emission standard.

As part of the suspension decision process, I examined a spectrum of control approaches to reduce ambient levels of oxidants, carbon monoxide, and nitrogen oxides. Clearly, better control of all major sources is necessary to attain and maintain the health standard for these pollutants. At this point, I would like to briefly outline the steps I believe we should take.

Let me interject, Mr. Chairman, at this point, that this suspension decision document does contain a fairly extensive analysis, comparative analysis of the various technologies available or potentially available. I think that this does provide a good summary of the state-of-the-art for the use of the committee. I have avoided in this statement at least recovering that same ground. It is obviously quite technical information.

Senator MUSKIE. I think it might be useful to include that document in the record.

Mr. TRAIN. Thank you, Mr. Chairman. (See p. 1397.)

In 1971, when relatively few cars on the road had any emission control at all, the tailpipe of the private passenger car—in terms of total nationwide emissions from mobile sources—contributed about one-half of all the hydrocarbon and oxides of nitrogen emissions and about two-thirds of the carbon monoxide.

As the exhausts of cars became cleaner, and the fraction of the total air pollution problem caused by them becomes smaller, it is now clear that to achieve the needed additional overall reductions in emissions that are required to meet ambient air quality standards, it is necessary to look harder at the other types of sources.

One such other source is the evaporation of gasoline—that is, hydrocarbons—from passenger cars. Investigations made by the EPA have shown that the test procedure on the basis of which we have enforced an evaporative emission standard do not capture all of the

evaporation that occurs. We are in the process of revising that test procedure and of imposing a standard that will more effectively control evaporative emissions. We plan to set this standard for the 1979 model year cars.

Light-duty trucks are another source category that is important. Such vehicles are extensively used in urban areas, for many of the same commuting purposes for which cars are used. From a technical standpoint, there is little difference between a car and a light-duty truck—they are designed and built in the same way, and often use the same engines. We plan to broaden our vehicle category to include all vehicles up to 8,500 pounds gross vehicle weight (GVW) and to set exhaust and evaporative emission control standards that are of a stringency comparable to that applied to passenger cars.

Heavy-duty trucks are another category of vehicles that require further control. Although subject to emission standards since 1970 and although more stringent standards were imposed in the 1974 model year, these vehicles are not controlled at this time to the degree we think ultimately will be necessary. We will be setting new standards for the 1978 model year.

In addition, we are working on a new test procedure that will permit a better evaluation of the real impact of heavy-duty trucks and buses on urban air pollution. That work involves getting actual operational data from instrumented vehicles that are operated in major cities, and finding a typical driving cycle for such vehicles.

It will be the 1981 or 1982 model year, at the earliest, before very stringent emission standards can be applied to the heavier vehicles, both because of work yet remaining to be done on the new standards and to allow leadtime for compliance on the part of the manufacturers.

Motorcycles are yet another category of sources for which emission standards are needed. They are currently not controlled at all, and certain types of motorcycles emit very high levels of hydrocarbons. On an overall nationwide basis, motorcycles don't contribute much pollution, but in certain parts of the country where they are widely used, they are significant sources. Such areas include southern California and New Jersey.

We expect soon to issue proposed standards, and we hope to make them final by the end of this year, so that 1978 model year motorcycles will be controlled. At the same time, we expect to set substantially more stringent standards, to be effective in the 1980 model year that will give the producers of two-stroke bikes, which are the high emitters of hydrocarbon, time either to develop the appropriate control technology or to shift to four-stroke engines.

In addition, inspection and maintenance programs are now being required to be implemented in communities with particularly high levels of vehicle-related pollution. Our tests show that many vehicles currently on the road do not meet emission standards. This is largely due to poor maintenance. Inspection and maintenance programs have the advantage of bringing vehicles closer to the original standards while at the same time improving fuel economy and performance.

We are also reexamining current regulations providing for control of hydrocarbon emissions from such things as paints, solvents, dry-cleaning liquids, and refineries with a view to tightening them. Many of these regulations were drafted some time ago and do not reflect the state of the technology which can be achieved with additional



A significant urban source of hydrocarbon emissions is the evaporation of gasoline during fueling of vehicles. Fortunately, this is one of the easier sources to control from a technological standpoint, and one we are requiring in many communities where the State has failed to develop an adequate plan.

At each stage where gasoline is transferred—into a tanker truck, into a service station, and into an automobile—the residual vapors in the near-empty tank are forced out to the atmosphere by the incoming fuel. These emissions are estimated to account for 5 to 15 percent of the overall hydrocarbon emissions in metropolitan areas. This regulation will result in some gasoline conservation.

With respect to the auto emission standards themselves, I think we have reached a point in our quest for the statutory automotive emission reduction requirements where there are today major issues which bear on these standards that received much less attention in 1970. In large measure, this is because of changing circumstances and an increase in our understanding of the magnitude of the Nation's air pollution problems. Today, we must be concerned about the necessity of improved motor vehicle fuel economy, consumer costs, and related impacts on employment, in addition to our continuing concern for air quality improvement.

In 1970 when gasoline was plentiful, inexpensive, and the possibility of embargoes by foreign suppliers was beyond our imagination, most Americans did not consider motor vehicle fuel economy as a major national issue. We know all too well the radical changes that have occurred in the last few years to make these matters major considerations.

The administration is moving toward a 40-percent improvement in gasoline mileage by the 1980-81 time frame. As reported by the Congress in the joint DOT-EPA fuel economy report, this objective can be attained without major changes in average auto size, even with the retention of the statutory standards for hydrocarbons and carbon monoxide.

The manufacturers' decision as to what emission systems they employ obviously has a bearing on fuel economy. For example, for the 1968-74 models, the manufacturers used a number of engine modifications to meet emission standards which resulted in poorer fuel economy. For the 1975 models, when the domestic manufacturers equipped most of their vehicles with the catalytic converter, fuel economy has been improved by 13.5 percent as an industrywide average for 1975 cars over the 1974 models.

It is clear to me that a 40-percent improvement in fuel economy can continue to be met within the framework of emission standards suggested in my March 5 suspension decision. I do not mean to suggest, however, that there is no relationship between emission reduction and fuel economy, but rather to state that any approach to emission standards which argues for a simple trade-off that has less control and more economy fails to take into account the technology options which are open to the industry to both meet stringent emission requirements and to have major fuel economy gains. The catalyst is a case in point.

Looking to the future, it is clear that fuel economy is related more to the technological choices made to meet emission standards than to any particular standard level, even though at any stringent standard

level there is, of course, a need for sufficient leadtime for the industry to fully develop and produce the technology that is also optimum from the standpoint of fuel economy.

A question that bears on the fuel economy issue is whether sticking with the current 1977 statutory emission standards for nitrogen oxide, instead of easing that requirement, will cause a further loss of fuel economy. Furthermore, this issue also involves the potential for increased sulfate emissions. As you know, in my suspension decision, I did not recommend that there be an easing of the nitrogen oxide standard of 2 grams per mile.

I reached that conclusion because I am satisfied that it is not necessary that there will be either a significant loss in fuel economy or an increase in sulfate emissions by going to the 2 grams per mile nitrogen oxide level in 1977. It is technically possible for the industry to use proportional exhaust gas recirculation systems that will permit the 2 nitrogen oxide standard to be met without fuel economy loss on all but the very largest of cars, and even on those, the fuel economy loss should be no more than 1 or 2 percent.

It is also technically possible for the industry to use more advanced hydrocarbon control techniques, such as start catalyst, that will avoid the use of air pumps which if added to a catalyst car, would tend to increase sulfate emissions. But this is a highly controversial issue. In stating what we believe to be technically possible, we cannot say with confidence what the industry will do.

If the industry elects to use less than the best possible exhaust gas recirculation system, or if the industry elects to add air pumps instead of using technology that can do the job without air pumps, there can indeed be some fuel economy loss and some increase in sulfate emissions.

In California, which already has standards more stringent than I have suggested through 1979, the industry is, of course, using air pumps and will have to continue to use them to meet the standards for which California has requested a waiver. To meet the more stringent 1980 Federal standards that I have suggested, the industry might well use air pumps. For the 1979 model year, we will have in effect the sulfuric acid emission standard that I expect to propose late this year.

Thus, during the interim, I expect the industry to act responsibly and to do the best that it can do, instead of just doing what is easiest; but I can't guarantee that they will in fact act that way. Thus, the committee needs to consider not only what can be done, but also what is likely to be done, in making its decisions on the question of 2 grams per mile nitrogen oxide versus 3.1 grams per mile nitrogen oxide.

Let me add at this point, Mr. Chairman, to put this in a little further perspective, as you know, the Clean Air Act operates on the principle of mandating standards and leaving the methodology of meeting those standards to the industry. We have never been in the business of mandating by statutory or by regulation the use of any technological alternative. So I think that general principle which has been followed up to now is implicit to the points that I was making in that paragraph.

Many who oppose further tightening of automotive emission standards have also argued that costs is the overriding issue. They state that the additional costs for emission controls will reach such a point



that the motoring public would reduce their purchase of new cars, which in turn would extend and even exacerbate unemployment in the automobile and related industries.

Emission controls have increased the price of new cars. Our estimates put this cost around \$125 to \$225, depending on the age of the car—certainly less than 5 percent of a new car's price. Additional costs would be involved in meeting the full range of statutory requirements particularly with respect to the nitrogen oxide 0.4 grams per mile standard. However, it is grossly unrealistic to attribute the decline in new car sales to this level of cost which, in our judgment, would account for less than a 1-percent decrease in new car sales.

I would like to give you a correction in that paragraph, Mr. Chairman. The sentence beginning "our estimates put this cost around \$125 to \$225, depending on the age of the car" should read "size of the car." So substitute the word "size" for "age." I didn't think it made much sense as I read it.

Senator MUSKIE. New cars are all the same age.

Mr. TRAIN. Let me say a few words additionally about nitrogen oxides control. As you are aware, in previous testimony before this committee, the Agency found the measurement method for atmospheric level of nitrogen oxides to be in error. Over the course of the last year and a half, we have been developing and field testing replacement methods. In the next month or two, we will be proposing a new Federal reference method.

Although our studies confirm that there are only a limited number of areas now violating nitrogen dioxide ambient air quality standards, the problem of growth in emissions from mobile and especially from stationary sources suggest that a more widespread problem will be evident in the years ahead. Because of this emerging problem, I suggested in my March 5 suspension decision that the 1977 nitrogen oxide standard should be retained at its current statutory level of 2 grams per mile.

However, given present technology, I do not believe that the 0.4 grams per mile statutory requirement for 1978 is a realistic one. The technology to reliably meet it, with reasonable fuel economy, has simply not yet been shown to be available. In any case, the achievement of the ambient air quality require—ambient air quality requirements for nitrogen dioxide will require increased attention to stationary sources of nitrogen oxides which are generally not controlled or are only minimally controlled at the present time, and which compose well over half of the nitrogen dioxide problem.

In closing, Mr. Chairman, I believe it is important to emphasize that automotive emission standards should represent a balance among economic, energy, technological, and health considerations—the latter being the statutory thrust of the Clean Air Act. Under today's circumstances, economic costs and fuel economy, of course, must be given increased attention. I want to call to the attention of the committee the fact that the President has this entire matter under consideration.

There is considerable uncertainty about many of the issues I have addressed today. This is neither unexpected nor surprising in a relatively new field as environmental quality. To the best of our abilities, we will provide whatever technical assistance the committee desires in its deliberations. Let me emphasize this is not the time to

discard the automotive pollution control provisions in the Clean Air Act, but rather to build upon their sound foundation, recognizing the changing world in which we live and the knowledge we have gained since 1970.

Mr. Chairman, I neglected to introduce those at the table with me at the beginning of my statement. If I may do so at this time, on my right is Dr. Wilson Talley, Assistant Administrator for Research and Development; on my left, Mr. Roger Strelow, Assistant Administrator for Air and Waste Management; on his left, Mr. Eric Stork, Deputy Assistant Administrator for Mobile Source Pollution.

Senator MUSKIE. Thank you very much, Mr. Train. I appreciate your statement. You have, I think, covered a wide range of the issues which have been discussed in these hearings and it is helpful to us to have your position. There are several members of the committee present. I will invoke the 10-minute rule again. I am sure there are many questions that all of us would like to put.

I would like, if I may, to begin consideration of the relationship between auto emission standards and the public health, that being the underlying basis of the Clean Air Act.

It has been made clear in these hearings that the health basis, of course, underlies the ambient air quality standards. That suggests to many that the emission standards are not necessarily directly relevant to the achievement of public health.

That impression, I think, has been encouraged by the testimony which we have received and more and more we are hearing from representatives of industries involved that we have achieved 80- to 85-percent reduction in the automobile standards, automobile emissions, that that is a dramatic improvement and the additional improvement would be achieved by going the rest of the way required by the statute is not that important to public health and that it is overbalanced by these considerations of fuel economy, cost to the consumer, the economic stage of the automobile industry, and so on.

So I think we ought to face that issue head on.

In your statement you give us some very useful data with respect to the extent to which automobile pollutants have been reduced by what has taken place up to now.

Even though that progress seems significant, it is more modest than the claims that are now being made by the automobile industry, if I read your figures correctly. But I would like to clarify that.

You say that compared to the 1970-71 models upon which the statutory 90-percent reduction required by Congress is measured, which had higher nitrogen oxide emissions than did precontrolled cars, the progress is 63, 56, and 38 percent, respectively.

Does that mean—it seems to mean—that we have reduced emissions of hydrocarbons 63 percent below that of the 1970-71 models?

Mr. TRAIN. Yes, sir. That is correct.

Senator MUSKIE. That 63 percent compares to the 90 percent that was mandated?

Mr. TRAIN. Mandated by the statute. That is correct.

Senator MUSKIE. So there would be 37 percent to go? Is that correct? Or 37 of that 90 to go? Twenty-seven, rather.

Mr. TRAIN. Yes, sir.

Senator MUSKIE. My mathematics is off. With respect to carbon monoxide we have 50-percent performance and 34 percent to go.

# STRATOSPHERIC OZONE DEPLETION

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## HEARINGS

BEFORE THE

SUBCOMMITTEE ON THE UPPER ATMOSPHERE

OF THE

COMMITTEE ON

AERONAUTICAL AND SPACE SCIENCES

UNITED STATES SENATE

NINETY-FOURTH CONGRESS

FIRST SESSION

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SEPTEMBER 8, 9, 15, AND 17, 1975

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PART 1



Printed for the use of the  
Committee on Aeronautical and Space Sciences

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1975

STATEMENT OF DR. WILSON K. TALLEY, ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT, U.S. ENVIRONMENTAL PROTECTION AGENCY; ACCOMPANIED BY DR. AUBREY P. ALTSHULLER, ACTING DIRECTOR, ENVIRONMENTAL SCIENCES RESEARCH LABORATORY, AND MR. MICHAEL A. JAMES, ASSOCIATE GENERAL COUNSEL, AIR QUALITY, NOISE, AND RADIATION DIVISION OF EPA

Dr. TALLEY. Thank you, Mr. Chairman. Accompanying me this morning is Dr. Aubrey P. Altshuller, Acting Director, Environmental Sciences Research Laboratory, Research Triangle Park and Mr. Michael A. James, Associate General Counsel, Air Quality, Noise and Radiation Division of the Environmental Protection Agency.

EPA welcomes this opportunity to discuss with the Subcommittee the potential problem to ozone depletion from release of some of the fluorocarbons and other halocarbon compounds which could result in significant public health problems. This morning I would briefly like to discuss how this problem came to our attention, what we see as some of the knowledge gaps in the existing data, our own research activities in the field, and possible governmental regulatory activities to deal with this particular problem.



## ATMOSPHERIC MODELS

Atmospheric models developed by Drs. F. S. Rowland and M. J. Molina, University of California, Irvine Campus; Drs. R. L. Cicerone, R. Stolaski, S. Walter, University of Michigan; Dr. P. Crutzen, NCAR; and Drs. S. C. Wofsy and M. McElroy, Harvard, indicate that fluorocarbon-11 ( $\text{CFCl}_3$ ) and fluorocarbon-12 ( $\text{CB}_2\text{Cl}_2$ ) and other long-lived chlorinated or brominated compounds can diffuse into the stratosphere where they will break up and produce chlorine and bromine atoms, and other free radicals which may react to deplete stratospheric ozone concentrations, particularly between 25 and 35 kilometer altitudes. The theoretical models then available predict substantial depletion of ozone, if uncontrolled production and use of these fluorocarbons and other halocarbons continue well into future years. Further, these investigators believe that ozone depletion is a long-term phenomenon and that only partial recovery is predicted by well into the twenty-first century. Even if release stops now or in a few years, some small depletion of ozone may occur. Depletion of ozone will result in increases in ultraviolet radiation reaching the Earth's surface. Such increases in ultraviolet radiation could raise the incidence of skin cancer, and might cause changes in crop yields in some farming areas.

I would like to stress significant knowledge gaps concerning this problem, however, remain to be filled. The additional knowledge necessary to substantiate or refute the theoretical models can and must be acquired. First, more exact rate constants are required for the chemical kinetic reactions to improve the quantitative precision of the models.

Second, the key intermediate species need to be quantitatively identified in the stratosphere. Third, work needs to be conducted on identifying all compounds that may have the potential of contributing to or preventing stratospheric ozone depletion. This requires measurement of halogenated pollutants and their oxidation products in the atmosphere and measurement of oxidation rates and mechanisms in the laboratory. Fourth, strategies for reduction or elimination of the problem through use of substitute chemicals or modes of dispensing consumer products must be evaluated.

## EFFORTS TO ASSESS ENVIRONMENTAL CHEMISTRY

EPA currently has several efforts underway to assess the environmental chemistry and measurement of fluorocarbons, other halocarbons and disintegration products. During the past several years, work has been conducted both in our own laboratory at Research Triangle Park and through research grants at Rutgers University and Pennsylvania State University. Currently, the program is being carried on at Research Triangle Park and under research contracts to the Ohio State University, the Washington State University, and the Stanford Research Institute. The work done includes the development of analytical methods for analysis of various fluorocarbons and other halocarbons, air quality measurements and chamber studies to assess the lifetime stability and reactivity of such compounds under various atmospheric conditions. This work substantiates the work of other investigators on the elevated concentrations of fluorocarbon-11 and 12 and carbon tetrachloride in the lower atmosphere. The data also show that methyl

chloroform and perchloroethylene may have significant lifetimes in the Earth's lower atmosphere. Chlorinated reaction products of halocarbons of intermediate lifetimes also may be capable of diffusing into the stratosphere.

#### ESSENTIAL STUDIES INITIATED BY EPA

EPA's Office of Research and Development, the Office of Air and Waste Management, and the Office of Water and Hazardous Materials through its Office of Toxic Substances, decided late in 1974 that a scientific and technical program on evaluation of the potential halocarbon problem was essential. We felt that we already had sufficient authority to conduct such research. Studies essential to estimating the potential for ozone depletion in the stratosphere which have been initiated by EPA include those to:

(1) Determine historical and current U.S. and world production of F-11, F-12, F-21, F-22, other fluorocarbons, carbon tetrachloride and other chlorinated industrial chemicals.

(2) Establish amounts of these chemicals consumed in end uses.

(3) Estimate losses of each chemical during production, transport, storage, use, and disposal to air.

(4) Measure these substances by infrared spectroscopy, gas chromatography and mass spectroscopy in urban areas, rural areas, over water, and to maritime locations.

(5) Estimate lifetime of these halogenated compounds in the troposphere.

(6) Measure products of tropospheric reactions and derive reactive mechanisms.

(7) Develop line-reversal infrared correlation spectroscopy for hydrogen chloride and apply technique to measurement of hydrogen chloride in the atmosphere.

(8) Conduct studies of stratospheric chemistry of halogenated compounds and their decomposition products under simulated conditions.

(9) Investigate the fate of halocarbon radicals of the general type CX-3.

This research is being conducted in the Environmental Sciences Research Laboratory of EPA at Research Triangle Park, North Carolina, by university investigators and under research contract. I would like to submit for the record a summary of the current program on halogenated compounds being conducted by the Environmental Sciences Research Laboratory, including a progress report on the intramural tasks.

I have it here with me.

Senator BUMPERS. That summary may be received into the record without objection.

Dr. TALLEY. Thank you.

[The summary referred to follows:]

ENVIRONMENTAL SCIENCES RESEARCH LABORATORY, RESEARCH TRIANGLE PARK, N.C.

SUMMARY OF RESEARCH PROGRAM ON HALOGENATED AIR POLLUTANTS—AUGUST 1975

1. *Title: Determination of Tropospheric Halocarbons by Gas Chromatography and Mass Spectroscopy*

*Objective.*—Measure distributions of halogenated compounds in rural areas, urban areas, and over water. Samples will be gathered in the field and returned

of the laboratory for analysis by gas chromatography and mass spectroscopy. Such compounds as  $\text{CCl}_4$ ,  $\text{CH}_2\text{I}_2$ ,  $\text{CH}_2\text{Cl}_2$ ,  $\text{CH}_2\text{Cl}_2$ ,  $\text{CH}_2\text{CCl}_3$  will be measured. Insights into the photochemical reactions will be derived from the detected concentrations and spatial distributions.

*Progress.*—A research grant proposal was solicited from Washington State University. The proposal was received and approved by intramural and extramural reviewers. The grant is presently being processed for award.

## 2. Title: *Infrared Analysis for Tropospheric Halogenated Compounds*

*Objective.*—Condense a large volume of air in a cold trap and boil off the oxygen and nitrogen. Vaporize the remaining condensate into a long path infrared cell and run the spectrum, using a Fourier Transform Spectrometer. Remove carbon dioxide interference by the ratio technique and measure the infrared bands of the other trace constituents. Trace gases with mixing ratios as low as one in  $10^{12}$  are detectable by this method. Samples will be collected at urban, rural, and maritime locations.

*Progress.*—This task has been carried out on an intramural basis. The pollutants have been condensed and analyzed using a mobile laboratory. Tests were carried out at Research Triangle Park, North Carolina, Atlantic Beach, North Carolina, and New York City. Background levels of Freon 11, Freon 12, Carbon tetrachloride, acetylene, carbonyl sulfide and other compounds have been established. Methyl chloroform and Freon 22 have also been measured, but have been shown not to be ubiquitous as is the case with the fully halogenated compounds. A paper entitled "Infrared Measurement of Halogenated Pollutants and Other Atmospheric Trace Gases," has been submitted to Journal of the Air Pollution Control Association.

## 3. Title: *Atmospheric Measurements to Determine Fates of Halogenated Compounds*

*Objective.*—Study the tropospheric distributions and chemical behavior of halocarbons. Direct atmospheric analysis will be carried out using the gas chromatographic method with electron capture detection and absolute coulometric calibration. Measurements will be made on urban air, maritime air, and inland air in a rural area.

*Progress.*—A research grant has been awarded to the Stanford Research Institute. A mobile laboratory is being prepared for measurements at Los Angeles, Point Reyes, California, and the Coachella Valley.

## 4. Title: *Atmospheric Analysis Over a Four Kilometer Optical Path*

*Objective.*—Record the infrared absorption spectrum of the atmosphere in an urban area, using an optical path long enough to bring out the weak bands of halocarbons, halogenated acids, phosgene, and related compounds. This task is directed towards understanding the photochemistry of urban air, including in addition to the halogenated compounds, the hydrocarbons, oxidants, nitrogenous compounds, and sulfur compounds.

*Progress.*—This is an intramural task, with contractor support. A multiple-reflection optical system is being constructed for use with a Fourier Transform Spectrometer. Eight mirrors will be mounted, four at each end, in an optical tunnel 25 meters long. The system will be operated on the roof of the Keck Engineering Building at the California Institute of Technology, Pasadena. The body of the absorption cell is under construction. The cell will be installed at Research Triangle Park for preliminary testing before it is moved to Pasadena. Mirrors will be delivered this month.

## 5. Title: *Tropospheric Photochemistry of Halogenated Compounds—Laboratory Studies*

*Objective.*—Rates of photooxidation of halogenated compounds will be determined under simulated tropospheric conditions. Rates of disappearance of reactants will be determined; products will be identified, and reaction mechanisms will be derived.

*Progress.*—A research grant was awarded to the Ohio State University in July. A long path photochemical reactor of unique design that has been constructed at the Ohio State University will be used in these studies. A government owned Fourier Transform Spectrometer will be used to monitor the progress of the chemical transformations.

## 6. Title: *Chemistry of Degradation of Halogenated Compounds in the Atmosphere*

*Objective.*—The chemical mechanisms of degradation of the halogenated pollutants will be determined in laboratory measurements. Photooxidations will be



carried out under simulated atmospheric conditions in a laboratory reaction chamber that permits observation of the consumption of reactants and the formation of products. Indications of stratospheric effects will be derived from the observed reaction products and rates.

*Progress.*—This task is being carried out on an intramural basis, complementary to the Ohio State Research Grant.

Five chlorinated ethylenes, along with chloroform, Freon 22, methyl chloroform, and methyl chloride have been studied in a long path, infrared cell and photochemical reactor. Identified products include monochloro, dichloro, and trichloro acetyl chlorides, phosgene, chlorinated peroxy acetyl nitrates, carbonyl chloro fluoride, trichloro acetaldehyde, formyl chloride, and hydrogen chloride. Many of these products have ultraviolet absorption characteristics that could lead to chlorine deposition in the stratosphere. A publication entitled "Atmospheric Oxidation of Chlorinated Ethylenes," has been submitted to Environmental Science and Technology.

#### 7. Title: *Halocarbon Reactions in the Atmosphere*

*Objective.*—Through laboratory experiments determine rates of degradation of halocarbon pollutants in the troposphere and stratosphere. Determine the lifetimes and the eventual fate of the intermediate products of the photooxidation.

*Progress.*—A research grant was awarded to the Illinois Institute of Technology Research Institute (IITRI) in July. A grant review was held in Chicago on July 30. The IITRI group will concentrate on (1) measuring the rate of OH attack on halocarbons, and (2) measuring photolysis rates, quantum yields, and products in the direct photo-dissociation of the acyl chlorides, phosgene, and other compounds produced in the photooxidation of the chlorocarbons.

#### 8. Title: *Hydrogen Chloride in the Troposphere*

*Objective.*—The abundance and distribution of hydrogen chloride will be determined in both urban and rural regions. From the measurements, inferences will be drawn as to the sources and sinks of HCl. Removal rates will be determined. The measurement technique will be line-reversal infrared correlation spectroscopy which will be capable measuring HCl partial pressures as low as  $10^{-10}$  Atm.

*Progress.*—This is an intramural task being carried out with contractor support. The transmitter for the non-dispersive analyzer for hydrogen chloride has been constructed, and operated successfully. Its operation will be tested over a 500 meter folded path in the laboratory.

### IMOS TASK FORCE STUDY

Dr. TALLEY. The Council on Environmental Quality and the Federal Council on Science and Technology jointly sponsored an ad hoc inter-agency task force on Inadvertent Modification of the Stratosphere—IMOS. The responsibility of IMOS was to assess the possible associations between fluorocarbons ozone depletion and the environmental effects, as well as to recommend a regulatory approach to the problem. This report was issued in June 1975. The research program initiated by EPA is fully consistent with the research recommendations of IMOS. In terms of regulatory actions, the IMOS report provided an excellent discussion of the process through which a regulatory decision would be reached, and recommended a comprehensive regulatory approach, if required.

### REGULATORY DECISIONS

As the IMOS study correctly indicated, the nature of the potential fluorocarbon problem is such that any regulatory decision should be made with caution and should be based on supportive scientific and technical data. A decision-maker must take into account the basic fact that the effects of releasing fluorocarbons and other halocarbon compounds into the atmosphere may not be apparent for 10 years. Yet, by the time the effects become measurable, an adverse impact may have already resulted. Therefore, before any decision to regulate can be



made, the significant knowledge gaps concerning the problem must be filled. As indicated above, EPA is conducting extensive research in the area; the results of this research along with that of the National Academy of Sciences study should supply the technical information necessary for decision-making. The timetable for the decision-making process is in the neighborhood of 2 years.

In terms of current regulatory authority, fluorocarbons used as propellants in pesticide products can be regulated by EPA under the Federal Insecticide, Fungicide, and Rodenticide Act. EPA believes also that it has existing authority under Clean Air Act section 303, the emergency powers section, to deal to a limited extent with the general release of fluorocarbons to the upper atmosphere. This section would permit an action to enjoin the production or use of fluorocarbons if EPA determines they are presenting an imminent and substantial endangerment to the health of persons. There are difficulties with this approach, however, as it protects only hazards to public health and does not extend to broader environmental endangerment, such as the risk to agricultural production. Furthermore, section 303 makes the courts the initial triers of facts on the health evidence, and it is possible that a court would be reluctant to ban the production and use of a product unless presented with an extremely strong health case.

A better regulatory approach, should one be needed, is the use of a comprehensive and general regulatory mechanism such as the pending Toxic Substances Control Act. Enactment of that Act would address both the public health risks and environmental threats which may be caused by chemical substances including fluorocarbons.

#### EPA PROGRESS REPORT

In conclusion, EPA is preparing a progress report on the activities related to ozone depletion. This report will contain information on atmospheric sciences related to the problem, usage patterns of these compounds, and available control technology and control strategy options. We will forward this report to the subcommittee as soon as it is completed.

Mr. Chairman, this concludes my prepared statement, briefly outlining actions which have been initiated by EPA to respond to the potential problem of ozone depletion.

My colleagues and I would be happy to answer any questions which you have.

Senator BUMPERS. Dr. Talley, when will this report be completed?

Dr. TALLEY. Within a month, perhaps less.

Senators BUMPERS. How much money is EPA spending on research in this area now?

Dr. TALLEY. In fiscal 1975, we programmed about \$290,000, and also contributed about \$25,000 to the National Academy study directly aimed at this particular problem. In 1976, I anticipate something on the order of \$300,000 to continue the work, unless more money is appropriated.

#### RESEARCH GRANTS

Senator BUMPERS. Most of this in the form of grants to Triangle Park, other universities, and so forth, that are doing this work for you?

Dr. ALTSHULLER. Yes, Mr. Chairman. That is a combination of in-house research, research grants to the several universities indicated, and several research contracts, yes, sir.

Senator BUMPERS. What coordination or efforts have you made to avoid duplicating efforts of other Federal agencies who are also doing research in this area, or industry or private universities?

Dr. TALLEY. When the problem first arose, I was contacted by several industrial groups who are examining all compounds that might contribute to ozone depletion. Further, we have communications on the working level with scientists in other agencies and in industry working on the problem, that contact ranges all the way up to the IMOS Committee and the Federal Council on Sciences and Technology on which I sit as a member and I laid my hands on the June 1975 report.

#### CLEAN AIR ACT

Senator BUMPERS. Dr. Talley, you say that section 303 of the Clean Air Act makes the courts the initial triers of fact on the health evidence, and it is possible that a court would be reluctant to ban the production and use of a product unless presented with an extremely strong health case, and then you follow that by saying that a better regulatory approach is one such as the mechanism provided in the Toxic Substances Control Act, which I think is sponsored by Senator Tunney in the Senate. Why do you think that?

Dr. TALLEY. Mr. Chairman, could I have Mr. James, from my General Counsel's Office, answer that question?

Mr. JAMES. The point there, Mr. Chairman, is the fundamental difference between an agency making a rule-making decision based on what it considers to be adequate evidence, and it becomes the initial trier of fact. Then the courts enter into the picture in judicial review, based on whether or not the agency's determination was arbitrary or capricious. It is somewhat different and can be importantly different from a trial court hearing of the evidence and making its decision, just based on the weight of the evidence as it interprets it.

Senator BUMPERS. In other words, you are referring to the normal advantage that administrative agencies have under the Administrative Procedures Act.

#### CAUTIOUS REGULATORY ACTION

Mr. JAMES. That is correct.

Senator BUMPERS. On page 6 of your testimony, Dr. Talley, you state that as the IMOS study correctly indicated, the nature of the potential fluorocarbon problem is such that any regulatory decision should be made with caution and should be based on supportive scientific and technical data. A decision-maker must take into account the basic fact that the effects of releasing fluorocarbons and other halocarbon compounds into the atmosphere may not be apparent for 10 years. Yet, by the time the effects become measurable, an adverse impact may have already resulted.

And then you follow that with what seems to me is almost a contradiction. You say, therefore, before any decision to regulate can be made, the significant knowledge gaps concerning the problem must be filled.

On the one hand, you have a problem which you may not get the results of for 10 years, but you are saying exercise caution.

# IMPLEMENTATION OF THE CLEAN AIR ACT—1975

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HEARINGS  
BEFORE THE  
SUBCOMMITTEE ON  
ENVIRONMENTAL POLLUTION  
OF THE  
COMMITTEE ON PUBLIC WORKS  
UNITED STATES SENATE  
NINETY-FOURTH CONGRESS  
FIRST SESSION

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MARCH 19, 20; APRIL 21, 22, 23, 1975

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SERIAL NO. 94-H10

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PART 1

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Printed for the use of the Committee on Public Works



STATEMENT OF  
HONORABLE RUSSELL E. TRAIN  
ADMINISTRATOR  
ENVIRONMENTAL PROTECTION AGENCY  
BEFORE THE  
COMMITTEE ON PUBLIC WORKS  
UNITED STATES SENATE  
MARCH 19, 1975

Good morning, Mr. Chairman and members of the Subcommittee, I welcome this opportunity to discuss with you our progress in implementing the provisions of the Clean Air Act and to bring to your attention some of the problems that we have encountered in our administration of the Act.

As I have stated to you before, we believe the Clean Air Act is one of the most important pieces of legislation conceived by the Congress. Its provisions for shared responsibilities by all levels of government and for participation of citizens in the governmental process for the protection of public health, and improvement in the quality of life are landmark.

Over the course of the last four years, we have learned much about the nature and effects of air pollution. We have also learned in our implementation of the Act that the needs of our society are ever-changing. Today, I want to share with you some of our experiences.



I believe it is important to point out that several studies which have attempted the very difficult and speculative task of quantitatively comparing costs and benefits have supported the standards set under the Act. For example, the National Academy of Sciences study of the automotive emission standards found that benefits would be commensurate with expected costs for meeting the statutory hydrocarbon and carbon monoxide standards. Furthermore, EPA research has shown that measurable damages of \$11.2 billion annually from sulfur oxide and particulates are more than double the annual expenditures needed for their control.

Despite the fact that the Nation has been sorely beset with energy and economic difficulties at precisely the time when the financial and other impacts of our air programs were beginning to be felt, the commitment of the American people to environmental progress remains firm. There is every evidence that the public strongly supports our clean air program and will not accept the argument that the Clean Air Act is somehow responsible for any significant share of our energy and economic difficulties. To the extent that other national policies require shifts in our energy and economic priorities, the more imperative it becomes that we not only refuse to relax public health standards and environmental safeguards, but insist even more strongly upon rigorous standards and safeguards.

The Nation can no longer afford to be as dependent on foreign sources of oil or as inefficient in our energy usage as we have been. As to the former, the usage of alternative fuels, such as coal, must be increased as soon as practicable. As a result some facilities will be unable to achieve full compliance with existing State emission limitations by the statutory attainment dates. Mechanisms have been provided in the Energy Supply and Environmental Coordination Act to give additional time for compliance with these limits in appropriate cases of conversion to coal but without in any case authorizing emissions to exceed the primary air quality standards set to protect health. As to increasing efficiencies in energy usage, increased emphasis must be, and is being given to automobile fuel economy.

The Clean Air Act must take account of these problems. This is not a time to dismantle the Act, but rather a time to provide necessary flexibility to deal with the problems at hand and to strengthen the Act's basic purposes--clean air for all our citizens at the earliest possible time.

The cornerstone of the Act rests on air quality standards. In 1971, EPA set standards to protect the Nation's health and welfare for six major air pollutants: sulfur oxides, particulate matter, nitrogen oxides, hydrocarbons, carbon monoxide, and photochemical oxidants. These standards have been the subject

of extensive debate since that time. Both the research community and industries subject to regulation have debated their propriety. I believe we have put these arguments to rest. Our continuing review and the studies undertaken by the National Academy of Sciences on sulfur oxides and on the motor vehicle related pollutants continue to support these standards.

In order to achieve National Ambient Air Quality Standards protective of health, the Act requires the States to develop plans designed to meet the standards within three years of EPA's approval. Under certain circumstances, extensions of up to two years can be granted.

Progress has been made in attaining the standards by the relevant dates. The mean annual average concentrations of sulfur dioxides have decreased by 25 percent and mean annual particulate matter levels have decreased by 15 percent from 1971 to 1974. Problems still exist, however, in urbanized areas particularly with the 24-hour standard for these pollutants. Emissions of automotive-related pollutants are decreasing nationally and can be expected to continue their downward trend as more new cars with emission controls replace older, high polluting models.

Although good progress has been made in reducing ambient particulates concentrations, it is anticipated that approximately

101 of the 247 air quality control regions in the nation will probably not attain the primary particulate standards by the mandated dates. When I speak of non-attainment, I mean the failure to meet national standards at one or more monitoring sites in an air quality control region. This does not necessarily mean that the air quality throughout the region exceeds the standards. The non-attainment may be caused by "fugitive dust," such as soil from arid lands that becomes airborne due to the wind, or by urban "background sources," such as street dust raised by wind and traffic, fires, cooking aerosols, and conversion of gaseous pollutants into particulates. An amendment is proposed to provide legal flexibility for the anticipated non-attainment of primary particulate standards, and to provide a revised statutory framework and timetable by which the original goals of the Act can be attained.

A similar problem exists with respect to the automotive-related pollutants. We are fairly certain that ten or more metropolitan areas cannot achieve the primary standards by the mandated dates without severe limitations on automobile use. Our proposed amendment to the Act could result in avoidance of extremely harsh control actions, such as gasoline rationing, while insuring that maximum feasible progress will be made toward achieving the primary air standards. As with particulates, the focus would be on implementing all reasonable measures as rapidly as possible.



My recent decision to suspend, for one year, the application of the statutory automobile emission standards for hydrocarbons and carbon monoxide should not be interpreted to mean that the national effort to control automotive-related pollutants should be deemphasized. The suspension decision was based solely on the need to protect public health from the effects of an unforeseen by-product of the technology used by industry to meet the emission standards, sulfuric acid from catalysts. Thus, the need for communities to control transportation sources through all reasonable means remains unchanged and indeed is probably heightened. I will be pleased to discuss the motor vehicle standards in detail at the later hearings you have scheduled for that purpose. However, I want to emphasize that the currently applicable controls on motor vehicles will result in continued reductions in hydrocarbon, carbon monoxide, and nitrogen oxides emissions.

Transportation controls are required by the Act where automotive-related pollutants have so heavily impacted a community that the Federal motor vehicle emission program will be inadequate to achieve air quality standards by the statutory attainment date and, in some cases, at any time in the foreseeable future. Transportation controls are now required for twenty seven metropolitan areas. As additional monitoring data becomes available it is clear that more

communities will need transportation controls. It should also be emphasized that these controls provide significant by-product benefits in the areas of fuel conservation, relief of traffic congestion, and enhancement of our urban environment. In the area of auto fuel economy, existing transportation control plans in our major cities could reduce the Nation's gasoline consumption by 2 percent.

The transportation controls that have been instituted vary from community to community depending on the magnitude of the problem. In most communities, however, major emphasis is placed on reinforcing the national emission control program for automobiles with vehicle inspection and maintenance programs, vapor recovery at the service pump and improvements in mass transportation. Supplementary control measures include retrofit of older high polluting vehicles, and both carpool programs and the development of parking management programs designed to reduce low occupancy vehicle use.

Under our proposed amendment to the Act, communities would be given the time needed, up to a maximum of five years, to meet the standards by implementing all reasonable control measures as expeditiously as practicable. Provision is also made for a further extension of time for those communities where the problem is extremely severe.

With a few notable exceptions, the States now have fully enforceable regulations covering stationary source emissions

as a part of their approved plans. We estimate that there are over 200,000 sources of air pollution nationwide subject to such regulation. Of this number we believe there are approximately 20,000 major sources accounting for 85 percent of the Nation's air pollution burden from stationary sources. Of the identified major sources, 71 percent are currently known to be meeting emission limitations or are meeting compliance schedule requirements. We expect this percentage to rise to more than 85 percent by the mid-1975 attainment date.

Particular sources, however, in several major industrial categories will not achieve emission limitations by the statutory deadline--notably in the power and steel industries. For the power industry, there has been an inadequate commitment on the part of many companies to implement permanent sulfur oxide controls, e.g., stack gas scrubbers or low sulfur coal.

With the increasing cost and other problems of oil and the unavailability of natural gas for utilities' use, a major control option has been foreclosed. The remaining fuel option, low sulfur coal, is in short supply and is projected to continue to be in short supply for at least the next few years.

There are a limited number of vendors who are experienced in installing stack gas scrubbers. It should be noted that this hardware is not a shelf item, but one that must be custom designed for the specific plant, which takes 2 or more years from design to installation of the unit.

Steel making industries and others with related operations are experiencing difficulties in meeting regulations due to the complexity of operations and hesitancy on the part of the industry to move rapidly in controlling emissions. We are hopeful, however, of having the industry on compliance schedules by the end of the current fiscal year. Some of these schedules will necessarily extend beyond the statutory attainment dates.

We have proposed several amendments to deal with these problems. We proposed to allow existing power plants in isolated locations additional time to install permanent controls. Such plants would be required to have permanent controls (principally low sulfur coal or scrubbers) not later than January 1, 1985. Extensions could be granted only if health standards could be fully protected during the interim. Enactment of this amendment would insure that scrubbers are installed first on new plants and plants in urban areas where population exposure is the greatest.

Although we believe that authority exists under the Clean Air Act to write enforcement orders for non-conforming sources extending beyond the statutory attainment date, some contend that our authority is not this broad. In an effort to avoid litigation and to place sources on enforceable compliance schedules at the earliest possible time, we are requesting confirmation of our authority in this area through an amendment applicable to all source categories.



A related amendment deals with the penalty provision for stationary source violations. Under the mobile source control provisions of the Act a court can assess a civil penalty for violations. In the stationary source area, only criminal penalties are provided. We are requesting that civil penalties of up to \$25,000 for each day of violation be provided for stationary source violations. We believe the existence of such penalties will significantly add to our enforcement capabilities and will aid in reducing potential non-compliance problems.

We are proposing a number of amendments to the Energy Supply and Environmental Coordination Act (ESECA). Under that Act, sources eligible for coal conversion orders must not cause or contribute to a violation of health standards. In addition, sources located in a region where the ambient health standard is being exceeded at some locations, must meet State implementation plan requirements at the time of conversion even though the source does not and would not cause or contribute to the violation. We believe sources should be allowed to convert wherever they may be located as long as the health standard will not as a result be violated.

Another of our proposed amendments to ESECA would allow current coal burning sources to continue using coal even though they are under compliance schedules which require them to switch to oil in the near future to meet Clean Air Act

requirements. This amendment would only apply to coal burning sources that do not violate the health standards. In the absence of enactment of this amendment approximately 60,000 barrels per day of oil would need to be used by power plants that otherwise need not be.

A related proposal would change the ESECA requirement that a source that converts to coal be required to comply with the applicable State emission limitation in effect at the time that the source was ordered to convert since some States are in the process of changing their emission limitations to facilitate the use of higher sulfur fuel. If a State revises its regulations sources could not take advantage of these new requirements. Also there may be some cases where State emission regulations are not stringent enough. I believe it is appropriate for converting sources to comply with the State emission limitation in effect at the time the applicable compliance date extension expires. The proposed amendment would effect this change.

Since 1971 EPA has either promulgated or proposed new source performance standards for 24 industrial categories. Such major categories as power plants, iron and steel mills, refineries, concrete plants, and non-ferrous smelters are covered by standards. We are now in the process of examining additional sources of nitrogen oxides and hydrocarbons for possible regulation under this section of the Act.

Occasionally there are circumstances where the setting of performance standards are infeasible. For example, it is extremely difficult and costly to measure emissions from petroleum storage tanks. In this case and a few others the establishment of design or equipment standards is more practicable. Our suggested amendment would confirm our authority to set such standards.

In December of last year, we promulgated regulations designed to prevent the significant deterioration of air quality. These regulations implement a policy which has developed over time involving considerable participation. While the regulations continue to receive judicial scrutiny, we believe that the approach taken is reasonable. It accommodates the competing values involved and is premised on the appropriate role of States and local communities in making key decisions, subject to limited EPA review.

Through the prevention of significant deterioration we are able to protect the environment and to foster better air pollution control planning. Further, the policy adds insurance that certain unregulated pollutants or pollutants which do not currently have a national public health standard are minimized.

We believe the Committee should give this matter early consideration. Implementation of a non-significant deterioration program should proceed without the uncertainties caused

by continuing judicial review or an unclear position within the executive branch or the Congress.

In closing, Mr. Chairman, I want to emphasize the willingness of the Environmental Protection Agency to work with the Committee in its deliberations on the Act. We believe that the amendments we have suggested to deal with specific problems are sound. We also realize that there may be other ways of accomplishing the same purposes. It is our desire to provide the Committee with whatever technical assistance it may need.

At this time, I would be happy to answer any questions you may have.



## STATEMENT OF HON. ROGERS C. B. MORTON, SECRETARY OF THE INTERIOR

The serious energy and economic problems which the United States currently faces come at the same time that the full impact of air quality programs under the Clean Air Act, including its financial costs and energy penalties, are beginning to be felt. Let me assure you, however, that I am firmly committed to the Clean Air Act's objectives and I believe that most Americans share that commitment.

Coal conversion is the keystone of an effective energy program in the fossil fuel age. It could save up to 400,000 barrels per day of imports by 1985. The Clean Air Act, as it now stands, prevents conversion to coal because:

We have problems resulting from court decisions with respect to significant air quality deterioration in areas already meeting health and welfare standards.

We have not been able to bring stack gas scrubbers on line or make available low-sulfur coal.

We intend to develop an intermediate program to meet our energy needs without undue environmental harm. That means using more coal and assuring that the clean air standards which power plants have to meet are reasonable. It means fitting the standards that apply to industry and autos to the available technology. And it means modifying clean air requirements that are too inflexible or wasteful.

These proposals are set forth in Titles Four, Five and Six of the Energy Independence Act of 1975. These provide adjustments and refinement of air quality regulations consistent with our philosophy of spreading the benefits and burdens of the program equitably. We do not intend to relax regulations applicable to the electric power or auto industry at the expense of anyone's health or welfare. We do not intend to discriminate among economic sectors to favor one at the expense of another.

I want to come back to coal for a moment. Coal is the only major fossil fuel that can be drawn upon immediately to meet our energy demand growth. Coal is our most abundant domestic fossil fuel. In the future, coal must make a significantly greater contribution to our energy mix. By 1985 our present 600 million ton coal production should roughly double. Converting large oil and gas fired boilers to coal—especially for electrical generation—can contribute substantially to this goal. In 1973, about 290 million tons of coal would have been required to replace the natural gas and oil used for electrical generation. By 1985 we project that coal conversions could have us the equivalent of 400,000 barrels per day of imported oil. Several of the amendments before you will make needed improvements in our ability to carry out the coal conversion program under the Energy Supply and Environmental Coordination Act.

Other specific parts of the Clean Air Act amendments will accommodate further use of coal without authorizing emissions to exceed the primary air quality standards set to protect health. Of the roughly 20,000 major air pollution sources which now account for 85 percent of the Nation's stationary source air pollution burden, nearly three-quarters are meeting Clean Air Act's emission limitations or compliance schedules contained in State implementation plans so that they can meet the mid-1975 date for attaining EPA's national ambient air quality standards. But we know that some industries will not meet the statutory deadline and in mid-1975 will be in violation of applicable emission limitations.

The power industry will, for example, not be adequately controlling sulfur oxide emissions. The unavailability of low sulfur fuels and failure to bring stack gas scrubbers on-line will require us to adjust and to formulate a realistic strategy for requiring this industry to shoulder its clean air burden. We have therefore proposed that existing power plants in relatively isolated locations where health related air quality standards would not be violated should have additional time to install permanent emission controls. But the time for meeting the permanent control requirements could not be extended past January 1, 1985, and extensions beyond 1975 could only be granted if the public health standard is met in the interim. Alternate air quality control strategies would be made available, such as the use of tall stacks or intermittent control systems. The effect of this amendment is to allocate permanent environmental controls to new plants and to the urban areas where they are most needed. Yet another amendment to the Clean Air Act would eliminate the regional requirement which prohibits major fuel burning sources from using coal where the violation of health related standards is caused by other sources. These changes amount to

marshalling our assets for maximum cost-effectiveness in meeting our environmental objectives.

Administrator Train has discussed these and other issues relating to the environmental and energy goals of our nation. Administrator Zarb will discuss some of these from a somewhat different point of view. It is often my job as Secretary of the Interior to balance these sometimes competing views. Day to day I have to reconcile environmental interests of the wildlife and recreational clientele of the Department with those of the land resources management interests and with those of managing our federal land energy and mineral wealth. As Chairman of the Energy Resources Council I have a similar balancing responsibility among sometimes competing advocacy agencies of government. The President's program has resulted from such a process of weighing priorities and attempting to accommodate the necessary and desirable elements of both.

Your support of the President's program, including the clean air amendments, will be a progressive contribution in terms of both energy and protection of the environment.

STATEMENT OF  
FRANK G. ZARB  
ADMINISTRATOR  
FEDERAL ENERGY ADMINISTRATION  
BEFORE THE  
COMMITTEE ON PUBLIC WORKS  
SUBCOMMITTEE ON ENVIRONMENTAL POLLUTION  
UNITED STATES SENATE  
WASHINGTON, D. C.  
MARCH 20, 1975

Good morning, Mr. Chairman and members of the Subcommittee. I appreciate this opportunity to discuss the Administration's proposed amendments to the Clean Air Act. My comments will focus on those recommended changes to the Act which have significant energy implications. I will reference to the extent possible the analyses that FEA has conducted and discuss the bases for these amendments, in order to assist this Subcommittee in its deliberations of the proposed amendments.

I believe the Administration's proposed Clean Air Act amendments should be enacted for three important reasons:

- First, certain existing provisions could result in adverse economic and energy impacts, which could outweigh the achievable environmental benefits.
- Secondly, there is the need to implement a national plan to increase the use of domestic coal resources, and

- Thirdly, we have the need to reduce the consumption of petroleum products in automobiles and powerplants.

The Clean Air Act amendments of 1970 were a major legislative landmark for the Nation. Great strides in reducing pollution from all major sources have resulted. However, since the passage of the amendments, our Nation has undergone significant changes which could not have been foreseen in 1970.

As a consequence of the change in the Nation's economic and energy situation, certain requirements and deadlines established in the 1970 amendments need to be deferred. This is not to say that the clean air goals must be sacrificed. We believe that the central goal of the Clean Air Act--the protection of public health and welfare--must be maintained. This goal has not been abandoned in the proposed amendments.

On the contrary, the effect of certain of the amendments will actually facilitate the attainment of environmental objectives, while reducing economic and energy penalties. The amendments are designed to allow for selective delays in those areas where additional time is necessary for the installation of needed control technology, development of domestic clean fuel resources, or attainment of improved decision-making information.



My testimony does not cover all of the analysis that has been completed within the Administration in examining the major Clean Air Act issues. However, additional supporting information will be provided to you in the legislative environmental impact statement which is now being prepared for the entire Energy Independence Act of 1975. This environmental impact statement is expected to be published later this month.

INTERMITTENT CONTROLS

I would first like to turn to the subject of intermittent control systems for powerplants.

FEA has previously studied the problem of the unavailability of required clean coal or needed control equipment to meet the State implementation plan emission limitations by the 1975-77 deadline. These assessments, and subsequent studies conducted by EPA, have indicated that because of the clean fuels deficit--that is, insufficient supplies of scrubbers or low-sulfur coal--certain State implementation plan requirements cannot be met by statutory deadlines. In order to meet primary standards in all areas, it will be necessary to extend compliance deadlines beyond the 1975-77 period, and allow the interim use of intermittent control systems in those areas where primary ambient air quality standards can be enforceably and reliably maintained through the use of such controls. This would permit the limited supplies of low-sulfur coal and control equipment, that are available, to be used in those areas with the greatest pollution problem, thereby assuring a more rapid nationwide attainment of primary standards.

The Administration's proposed amendment relating to intermittent control systems would implement such a strategy by providing additional time for eligible plants to install continuous

emission control equipment, and by allowing additional time to contract for supplies of low-sulfur coal as they become available.

The amendment would also relieve uncertainties which now inhibit the development of the Nation's coal resources. Higher sulfur coal would have a definite mid-term market, and could continue to be used by plants as they install scrubbers. The long-lead time would also permit the development of low-sulfur coal supplies. In addition, capital expenditures and energy penalties associated with scrubbers would be delayed. Furthermore, the deferral in capital expenditures would help to alleviate the current financial difficulties of the electric utility industry. The economics of sulfur dioxide control have been analyzed in a recent EPA study (November 1974) that was submitted to the Energy Resources Council.

The Administration's proposed amendment will ensure the permanent control of sulfur oxides emissions from powerplants, while allowing additional time for scrubber installation or acquisition of long-term low-sulfur coal contracts. The proposed amendment would authorize compliance schedule extensions to allow rural powerplants up to January 1, 1985, to install and operate scrubber systems or acquire long-term low-sulfur coal contracts. Until permanent emission control systems are operational, these plants could employ intermittent control systems, where reliable and enforceable, to meet primary ambient standards. Under no circumstances would extensions be granted

in areas where the primary (health-related) sulfur oxides standard would be violated.

All other existing plants, especially urban plants, would be required to install permanent controls as expeditiously as practicable. New sources would continue to be required to meet new source performance standards. EPA, at the same time, is continuing to encourage the revision of State implementation plan emission limitations that are more stringent than necessary to achieve primary ambient air quality standards.

Objections to the use of intermittent control systems have been raised. The major objection to their use has been the concern that they do not minimize sulfur oxide emissions; but rather use the dispersive capabilities of the atmosphere to achieve ambient air quality standards. EPA has been particularly concerned about the widespread use of intermittent controls because of a potential sulfates health problem.

FEA's Office for Environmental Programs has closely followed the activities in the scientific community regarding the sulfate question. In addition, FEA supported a separate, independent appraisal of current research knowledge regarding health criteria for sulfur oxides. Today we would like to provide to this Subcommittee a draft copy of the report titled: "A



Critical Evaluation of Current Research Regarding Health  
Criteria for Sulfur Oxides" by Tabershaw/Cooper Associates.

Tabershaw/Cooper is a medical consulting firm which has been involved in the development of several criteria documents used in setting occupational health standards, including sulfur dioxide and sulfuric acid, for the National Institute of Occupational Safety and Health.

FEA has recently received the Tabershaw/Cooper report, is now assessing the results, and we are discussing the report with EPA, and other appropriate agencies.

We believe certain of the conclusions in the report, presented below, are noteworthy:

- The extent to which general air pollution must be controlled--in quantitative terms, in order to eliminate totally the adverse health effects in the community--has not been resolved.
- It is not possible, from the evidence now available, to determine the quantitative contribution or relative importance to the deleterious health effects, of separate classes of air pollutants.
- Attempts to further distinguish and differentiate between the causal contribution to health harm of particulate sulfates and sulfur dioxides, by epidemiological and statistical means, have not been found to be valid.

The Tabershaw/Cooper report raised questions as to whether data now available are adequate for formulating sulfate control strategies. Other organizations and individuals who testified before the EPA automobile emission suspension hearings, have similarly expressed concern over the present gaps in the scientific basis for determining the potential sulfate health effects from powerplant emissions.

The Administration's proposed amendment on intermittent control systems also provides the opportunity to defer the use of continuous controls for sulfur dioxide for non-urban coal burning powerplants until more refined control strategies can be developed. In the interim, acquired knowledge on sulfates should provide a sound basis for developing viable geographical specific control strategies that will allow for the protection of public health in a cost-effective manner.

The use of intermittent controls is consistent with our national energy program in that it encourages the utilization of coal. An EPA analysis has indicated that between 18 and 70 plants could use intermittent controls to meet ambient air quality standards for sulfur dioxide. These plants would burn 36 to 106 million tons of high sulfur coal per year,

which could, in effect, free up an equivalent amount of low-sulfur coal for facilities that cannot utilize intermittent controls, or avoid the use of an equivalent amount of petroleum.

ESECA AMENDMENTS

I would now like to turn to the proposed amendments to the Clean Air Act that relate to the coal utilization program established by the Energy Supply and Environmental Coordination Act of 1974 (ESECA). First, however, I would like briefly to review the strategy which FEA has used in implementing the authorities given to FEA by ESECA, and then to discuss the amendments which the Administration has proposed, in Title IV of the Energy Independence Act, relating to FEA's authorities under ESECA.

As you know, FEA may issue orders converting certain powerplants and major fuel burning installations to coal, and requiring plants already using coal to continue doing so. Specified air pollution requirements must be met, however, before the FEA order goes into effect. FEA may also order powerplants in the early planning process to be constructed with coal burning capability.

Our strategy for implementing ESECA has been to focus on long-term oil savings, rather than short-term conversions. This strategy was adopted for two principal reasons. First, coal supplies have been extremely limited, due to the effects of the oil embargo at the beginning of 1974 and the United Mine Worker work stoppage at the end of 1974. Hence, potential short-term oil savings have been limited. Second, FEA determined that resources for implementing ESECA



could best be allocated to achieving substantial long-term oil savings through long-term conversions to coal, and through requiring new powerplants to be constructed with the capability to burn coal.

We recognize that the capital expenditures which may result from an FEA order pursuant to ESECA may be significant, and that the utilities industry is currently burdened with capital and cash-flow pressures. We have therefore proceeded carefully to develop thorough engineering and economic analyses prior to concluding which plants will receive FEA orders.

Specifically, we studied in detail nine selected powerplants, to determine the technical problems and the environmental effects of reconversion to coal. We then, using a list of 725 plants which responded to the FPC's Emergency Fuel Convertability Questionnaire, identified the powerplants in the U.S. that might be able to convert to coal. By applying a lengthy screening and verification process, FEA substantially reduced the number of potential candidates for conversion to coal. A comprehensive investigation of this smaller group of plants is being conducted. Using already existing data, as well as the information developed during these FEA investigations, FEA will reach determinations as to which plants should receive FEA orders.

FEA has proposed regulations implementing the coal utilization program, and has published a comprehensive draft environmental impact statement. The comment period for the impact statement closed March 17, and we are now evaluating the comments we have received. It is expected that the final impact statement will be published by April 10.

In order to extend and expand the coal utilization program, the Administration is proposing three amendments to FEA's authorities under ESECA.

The first proposed amendment to ESECA would extend FEA's authority to issue orders by two years from June 30, 1975 to June 30, 1977. As I just discussed, FEA is conducting comprehensive investigations of a group of potential conversion candidates so that FEA will be able to make, with an acceptable degree of certainty, the findings required by ESECA.

FEA will be able to complete its investigation of many, but not all, of the potential conversion candidates by June 1975. This proposed amendment will allow FEA to issue orders to all powerplants which investigation shows to be appropriate conversion candidates. This could result in a potential additional savings of 200,000 bbls/day of oil.

In addition, the extension of FEA's order-issuance authority will permit FEA to issue orders to a sizeable group of major fuel burning installations other than powerplants. Although these installations represent an extremely large potential oil savings, the Federal government has no firm data base to provide the necessary information on the convertability of these units to coal. FEA is developing the first accurate energy use inventory of the approximately 65,000 industrial boilers of significant size. In addition, FEA is developing a

questionnaire to be completed by all larger MFBI's. Responses to the questionnaire will be used to select a group of candidate plants to undergo detailed economic and environmental analyses. The survey effort could not produce adequate data to support issuance of any substantial number of orders by June 30, 1975. However, such orders in the future, could produce a potential savings of 200,000 - 500,000 bbls/day of oil in the industrial sector by 1980.

The extension of FEA's order-issuance authority will also provide an additional two-year period in which to order powerplants in the early planning process to be built with coal burning equipment. FEA will be able to order plants that enter the "early planning process" as late as June 1977 to be built with coal-burning capability.

The second amendment to ESECA extends FEA's authority to enforce its orders through December 31, 1984. This is a six year extension of FEA's present authority under ESECA.

This extension will insure that the plants which FEA converts from natural gas and petroleum products to coal will continue to use coal for the critical period until 1985. Thus, the oil savings achieved by FEA through great effort will not be lost by voluntary reconversions during the period between 1979 and 1985. Also, plants which must install pollution control equipment before they can convert to coal -- in order to meet air pollution requirements -- will have an additional six years to do so.

The third proposed amendment to ESECA expands FEA's authority to issue prohibition orders to include powerplants or major fuel burning installations which are designed with or actually acquire the capability of burning coal after the date of passage of ESECA, June 22, 1974. This provision would apply to any existing powerplant or major fuel burning installation which acquires coal burning capability after June 22, 1974; to new powerplants and major fuel burning installations which are built voluntarily with coal burning capability; and to powerplants that receive orders from FEA requiring them to be built with coal-burning capability. All new plants affected by this amendment would be subject to applicable New Source Performance Standards.

Requiring powerplants in the early planning process that receive FEA orders, or are eligible for them, actually to burn coal will result in substantial oil savings -- which will be realized until 1985 if the proposed amendment extending FEA's order-enforcement authority is enacted. Requiring plants that were past the early planning process but were not operational in June 1974 to burn coal, if they have the necessary facilities, will also result in additional oil and gas savings. These additional savings for new powerplants and industrial plants of 400,000 bbls/day of oil cannot be realized under the existing ESECA legislation.



In addition to the proposed amendments contained in Title IV of the Energy Independence Act, the Administration is proposing several Clean Air Act amendments that will facilitate conversion of powerplants and major fuel burning installations to coal, while continuing to protect the public health.

First, the Administration is proposing to eliminate the regional limitation provision which now requires a plant to meet SIP emission limitations at the time of conversion pursuant to an FEA order, if there is a violation of primary ambient air quality standards anywhere in the air quality control region in which the plant is located. This requirement applies whether or not the individual plant itself is causing or contributing to the violation of primary standards. Removal of the regional limitation will mean that many plants could convert to coal at an earlier date. We estimate that the regional limitation provision postpones conversions to coal which would result in approximately 236,000 barrels per day oil and oil equivalent natural gas savings in 1977.

Requiring permanent controls before allowing conversion to coal (where not necessary to meet primary standards) would greatly increase the immediate cost of a coal conversion program. Accordingly, it may be impossible for FEA in some cases to make the finding that a conversion requiring the immediate addition of permanent controls is environmentally "practicable." If FEA cannot make a finding of practicability as required by ESECA, a conversion order cannot be issued.

Hence, the effect of regional limitations in ESECA may be to reduce the number of conversions significantly -- or at least to delay them -- and thereby to forego or delay the corresponding increase in consumption of coal and the reduction of the imported oil.

Removal of the regional limitation will not jeopardize public health, since the plants will still be required to meet primary ambient air quality standards before burning coal.

A second proposed amendment makes it clear that plants which have historically burned coal and which had, prior to receiving an order from FEA, planned to convert to oil to meet Clean Air Act requirements, are eligible for compliance date extensions under section 119 if they are ordered by FEA to continue using coal. FEA has established that there are several powerplants which plan to switch from coal to oil to meet Clean Air Act requirements; there are undoubtedly also major fuel burning installations in this class. The proposed amendment would enable such plants to have sufficient time to install pollution control equipment for coal burning instead of being forced to switch to oil first to meet pollution requirements, and then later ordered to make another switch back to coal when pollution control equipment is installed. This amendment furthers the goal of coal conversion and eliminates needless, expensive fuel switching in the interim.

A third proposed amendment would permit a plant that received a compliance date extension under ESECA to come into compliance, at the expiration of this extension, with the state implementation plan (SIP) that is in effect at that time. Under existing ESECA authorities, EPA is conducting a review of SIPs to identify those which are more stringent than necessary to attain and maintain national ambient air quality standards, and it will recommend that such SIPs be revised. This amendment would allow plants that receive FEA orders to comply with any revisions in the SIP, thereby assuring that such plants receive equitable treatment in comparison with other plants that do not receive FEA orders and compliance date extensions.

Without this amendment, the conversion program will result in plants that receive compliance date extensions being tied to 1975 SIP's. in most instances. This may result in additional expenditures for permanent emission control devices which are no longer needed. In extreme cases, where FEA could not find the conversion to be economically feasible if the source were compelled to meet the 1975 SIPs, this amendment would permit conversions that would otherwise be entirely precluded.

A fourth proposed amendment extends the date of termination of compliance date extensions one year, to January 1, 1980, as a conforming amendment to the proposal to extend FEA's order-issuance authority to 1977. This will permit plants receiving orders and compliance date extensions during the period June 1975 to June 1977 to have an additional

period to come into compliance with SIP's. This amendment would, at a maximum, have the effect of extending compliance dates for ESECA coal conversion candidates one year.

This amendment would allow a more reasonable time frame for plants to install pollution control equipment. Of the total 24,675 megawatts of existing utility capacity which FEA is examining for conversion potential, preliminary analysis shows that 8,000 MW need new precipitators and 10,092 MW need to install flue gas desulfurization systems. Precipitator installation lead time is 28-32 months and that for flue gas desulfurization is 3-5 years.



SIGNIFICANT DETERIORATION

I would now like to discuss the Administration's proposed significant deterioration amendment. Sierra Club v. Ruckelshaus, held that the Clean Air Act requires the prevention of significant deterioration of the Nation's air quality where the air quality is better than that dictated by the Federal health and welfare standards. In light of the decision, EPA recently promulgated final regulations to implement its best judgment of how to prevent significant deterioration of existing clean air areas. These regulations are now the subject of several court challenges by industry and environmentalists, and a period of legal uncertainty is anticipated.

The litigation on the significant deterioration issue was initiated in 1972--at a time when the country lacked a unified national policy on energy. The Nation's consumption of petroleum was skyrocketing then, as were imports from foreign sources. A related objective of the litigation was to promote energy conservation, and limit the development of new fossil fuel powerplants in this country.

The country's energy situation has changed since that time, and the President's Energy Independence Act of 1975 has been proposed to redirect our Nation's energy future. The energy program

calls for mandatory and voluntary energy conservation--policies that have for years been called for by the environmentalist and the conservationist. However, the energy program additionally calls for a substantial increase in the development of our domestic fossil fuel resources for the sake of reducing our vulnerability to foreign energy sources.

The actions proposed to make our Nation less vulnerable would include the construction, by 1985, of:

- ° 150 major coal fired power plants,
- ° 30 major new oil refineries, and
- ° 20 major synthetic fuel plants.

As the supporting analyses for the President's program clearly show, the expansion of our domestic coal resources, and the development oil and gas resources, are necessary to reach the goals of energy independence. Energy conservation alone will not achieve the goal of energy independence. The program also includes proposed legislation that would assist in planning, siting, and constructing the necessary energy facilities to meet the 1985 goal. Legislation that addresses the financial problems of the utility industry has also been proposed. FEA believes the proposal to delete the significant deterioration requirement is consistent with the needs of this program.

The additional uncertainties created by yet another layer of regulatory requirements on the energy industry is not compatible with the goal of expeditiously developing needed domestic energy resources. There is a need to simplify and rationalize the complex regulatory constraints on the domestic energy industry.

Under the significant deterioration program, States could stop or greatly limit resource development activities in certain geographical areas. We believe that siting decisions should be based on a balancing of all environmental factors--not just air pollution--as well as socioeconomic, energy efficiency, and other considerations.

Reports by the National Academy of Sciences and others, have shown that current scientific evidence does not support the need for ambient standards more stringent than the currently promulgated primary and secondary ambient air quality standards for particulates and sulfur dioxide. Accordingly, FEA does not believe the potential benefits from the significant deterioration program justify the potential cost of constraining the development of domestic energy resources.

FEA is particularly concerned about the impact of this uncertainty in delaying development of needed energy resources, especially the construction of large, coal-fired powerplants in the short-term, and synthetic fuel facilities in the longer term. In addition, the significant deterioration regulations could have a major inhibiting effect on the location of new energy projects; and groupings of several energy facilities in one area could be restricted under the regulations.

Accordingly, the President has requested that Congress clarify its position regarding significant deterioration. Specifically, Title VI requests Congress to provide that the Clean Air Act does not require or authorize EPA to establish standards more restrictive than primary and secondary ambient air quality standards.

No measureable impact on public health from the proposed amendment is anticipated, since air quality would not be permitted to deteriorate beyond the national ambient air quality standards, which are based on public health and welfare considerations. The States of course would remain free to impose and enforce standards more stringent than national standards. Furthermore, all new sources are required to meet new source performance standards, which incorporate the best available control technology. Therefore, all new sources are already minimizing pollution to the greatest extent possible.



AUTOMOBILE EMISSION STANDARDS

In 1970, the year the historic amendments to the Clean Air Act were enacted, our Nation's energy position was beginning to deteriorate. Total petroleum use was about 14 million barrels per day, and imports represented only 20%. In 1973, energy consumption had grown to 18 million barrels of oil per day, with more than 6 million barrels, or over 35%, made up of imports. If this trend continues unaltered, our projections indicate that, even accounting for the reduced consumption caused by last year's price increases, the United States could depend on foreign oil for better than half of its daily oil consumption by 1985. This growing dependence on imported oil threatens not only our economic solvency but -- considering the possibility of another oil embargo -- represents a serious threat to our national security. The President is determined to act on this critical problem and has charged FEA with part of the responsibility for identifying and implementing measures to reduce our energy vulnerability. We have focused on automobile fuel economy as an area in which significant fuel savings can be produced.

The transportation sector currently accounts for one-fourth of all the energy consumed in the United States. Since it relies almost exclusively on oil for fuel, transportation is responsible for over half of the Nation's total petroleum consumption.

Motor vehicles consume almost 80% of transportation energy or almost one-fifth of all U. S. energy. Automobile fuel usage has grown at an average annual rate of 5% during the last 20 years. If previous patterns continue, daily auto fuel consumption will nearly triple by 1990. As a result of these alarming trends, the Administration has focused considerable attention on reducing fuel consumption by improving automobile fuel economy.

It was with these facts before him that President Ford, back in October of 1974, addressed the issue of improving new car fuel economy. He obtained voluntary commitments from the automobile manufacturers to improve the production weighted average fuel economy of their new cars 40% by 1980.

Achievement of the President's 40% fuel economy improvement goal would have the following beneficial impacts:

- Increase the fuel economy of an automobile, which averaged 14.0 mpg in 1974, to 19.6 mpg in the 1980 model year.
- Reduce the total amount of projected automobile gasoline consumption in 1980 from 5.65 million barrels of gasoline per day to 5.05 million barrels--a savings of 600,000 barrels of gasoline per day. This gasoline reduction translates into a cost savings of 14.1 million dollars per day (using \$.56/gallon and 1975 dollars).

- A 10.6% reduction in imports would occur by 1980.

[I would like to provide the Committee, for the record, a table which projects a year by year analysis of how a 40% improvement in automobile fuel economy will affect average mpg, total gasoline consumption, and percent imports needed.]

As a part of the 40% fuel economy improvement program, the Administration has recommended that the Clean Air Act be amended to provide a five year suspension of automobile standards at the following levels--from 1977 to 1981: 0.9 HC, 9.0 CO, 3.1 NO<sub>x</sub>. The automobile industry assured the President that at these emission levels, the 40% fuel economy goal could be achieved.

Since the Energy Independence Act was submitted for enactment, the EPA Administrator has announced the suspension of the 1977 automobile standards for HC and CO, because of a potential health problem associated with catalyst equipped automobiles--sulfuric acid emissions. In addition, the EPA Administrator recommended emission standards for the 1975-1979 model year period--1.5 HC, 15.0 CO, 2.0 NO<sub>x</sub>--which would limit the use of catalysts. For the 1980-81 model years, Mr. Train has recommended the President's proposed standards of 0.9 HC, and 9.0 CO. In addition, Mr. Train indicated that EPA will promulgate a sulfuric acid emission standard for automobiles for the 1979 model year.

We are assessing Mr. Train's recommendation in relation to a 40% fuel economy improvement by 1980. We are hopeful, that at the levels proposed by Mr. Train, the automobile manufacturers will still be able to meet the 40% fuel economy improvement goal. We plan to meet with representatives from DOT and EPA to explore this matter further.

While catalysts allow for re-tuning of the engine, which contributed to the 1975 model year increase in fuel economy, we concur with Mr. Train's findings that the potential exposure of the public to increased sulfuric acid mist may prove to be significant in the long term. We also concur that his proposed standards can be attained by technologies other than the catalyst.

Concurrent with the automobile sulfuric acid problem, two points have been raised relative to the need to limit the sulfur content of gasoline. One is the possibility of desulfurization of the feedstock, and the other is re-blending of the feedstock, to allow maximum usage of low sulfur content fuels in areas where the sulfuric acid emissions may be the greatest. The economic impacts of desulfurization appear, at this time, to be significant. Preliminary indications are that it would cost the petroleum industry \$4 to \$6 billion to install needed desulfurization equipment. However, we are evaluating both alternatives, and, as yet, do not have a firm position on these proposals.



TRANSPORTATION CONTROL PLANS

The administration has proposed an additional amendment that relates to automotive emissions. The proposed amendment, relating to Transportation Control Plans, would provide for extensions that will permit a more realistic approach to the attainment of national primary ambient air quality standards. This amendment would allow the EPA Administrator to extend for the shortest reasonable period--not to exceed 5 years--the deadline for attaining national primary ambient air quality standards. Provision is also made for a second 5-year extension for those communities where the problem is extremely severe. Extensions would be provided to communities only where the community has adopted all reasonable control measures and is still unable to achieve the standards.

At present, the short time span remaining for compliance (1975-77) does not allow for all affected areas to reasonably implement needed control measures. Approximately ten metropolitan areas would be required to take extraordinary measures to control automobile usage, if no deadline extension is granted. Therefore, we believe that the amendment will allow for a more balanced approach to transportation planning.

CONCLUSION

Mr. Chairman, FEA has closely examined over the last year the relationship between the Clean Air Act and domestic energy consumption. We believe the changes in the Act cited above are necessary to achieve the energy and environmental goals of the Administration. We welcome the opportunity to provide for the Subcommittee the basis of our positions on these important matters.

At this time, I would be happy to answer any questions you may have.

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## CHAPTER 14

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### LEGISLATIVE RECOMMENDATIONS

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Statement of  
GENERAL MOTORS CORPORATION  
to the  
Subcommittee on  
Environmental Pollution  
of the  
Senate Public Works Committee  
on  
CONTROL OF MOBILE SOURCE POLLUTION

Presented by  
Elliott M. Estes  
President

General Motors Corporation

Washington, D.C.

May 15, 1975

(7317)

Mr. Chairman, I am E. M. Estes, president of General Motors. My purpose in responding to your invitation is to continue the very important dialogue which has existed between our Corporation and this Committee.

#### Introduction

The Clean Air Amendments of 1970 require the Environmental Protection Agency to make annual reports to Congress on progress of the auto industry in meeting the 90% emission reduction standards prescribed therein. At GM, we have provided volumes of information and data to EPA for purposes of making these reports and keeping Congress informed.

Independently of the prescribed flow of information, General Motors has testified or submitted statements to Congressional committees on many occasions over the last two years on the related subjects of emissions control, alternate power plant research, and most recently on energy conservation and automotive fuel economy. In fact, if averaged out since 1972, the record would show that we have reported to Congress on these subjects almost once a month. If we were to include formal submissions to federal agencies on these and other subjects, this frequency would increase dramatically.

#### Scope of GM Testimony

That amount of reporting we feel has contributed to a wealth of information available to Congress for understanding the technical base which controls the auto industry's capability in auto emissions

reduction. While we are pleased to note understanding of many of our problems in Congress, we continue to be concerned about the lack of understanding of others. Perhaps this is natural because of the complexity of air pollution control and the automobile.

However, some of the most urgent and fundamental problems we faced over two years ago, and which require Congressional action to correct, are still unresolved. Two such unresolved problems about which we've previously spoken are the unnecessarily stringent automotive NO<sub>x</sub> standard, and the illogical relationship between effective dates for primary ambient air quality standards and compliance dates for auto emission standards under the 1970 Act. There is an increasing amount of evidence that the positions taken by General Motors two years ago on these subjects have been vindicated.

There are other problem areas arising out of the 1970 Act which are more current in their origin and impact upon industry and other regulated entities. On these we will report our most current information, test data, projections and experience, so that Congress can proceed on the basis of the best information available to us.

Such items of current origin are the performance of catalytic converter systems in customer use, sulfate emissions, fuel economy, a productive pause before more stringent emissions/safety/damageability standards are imposed, and the need for continuing cost/effectiveness review of administrative regulations and procedures.

Finally, although not necessarily in the order listed, we would like to explain GM's role in development of mass transit technology and production of hardware as part of transportation control strategies available to large metropolitan areas in their attempts to comply with air quality standards.

Unnecessarily Stringent Oxides of Nitrogen ( $\text{NO}_x$ ) Standard for Automobiles (90% reduction originally established for 1976 models)

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Before the Clean Air Amendments of 1970 were passed, the auto industry had alerted Congress that the technology to reach the 90% reduction in emissions was not fully developed, and that in particular, the oxides of nitrogen standard was unnecessarily stringent. Since that time, this latter view (i.e.,  $\text{NO}_x$ ) has been frequently reinforced by government and industry spokesmen.



After EPA publicly admitted that the data on which the automotive NO<sub>x</sub> standard was based had been developed in error, and that the automotive 0.4 g/mi standard could safely be relaxed, at least ten non-industry scientific, government or academic study groups reached the same conclusion. See Attachment I.

We think it important to realize that many Congressional spokesmen, National Academy of Sciences reports, comments by environmentalist experts have said there is insufficient evidence to warrant a change in the NO<sub>x</sub> air quality standard -- note they are referring to "air quality" standard -- at this time. We agree. But this is not, and should not be construed as, any reason why the automotive NO<sub>x</sub> emission standard should not now be changed. Although there is a relationship, the two are quite separable.

As EPA has pointed out on several occasions, it was a mistake to establish the automotive NO<sub>x</sub> standard at the 0.4 g/mi level. The Agency has said that it can be relaxed with no increase in risk to public health and with no threat to achievement of the air quality standards for virtually every area of the country.<sup>(1)</sup>

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(1) Russell E. Train, Administrator, EPA in Testimony before Senate Subcommittee on Environmental Pollution, June 3, 1974

The urgent message we present today in restating this critically important problem is that the NO<sub>x</sub> standard, in order to be changed, must be changed by Congress, and as quickly as possible. Otherwise the tremendous waste of money, manpower and facilities in the fruitless effort to achieve an unnecessary objective must continue. Our research programs during the last two years have brought us no closer to meeting the standard and development of alternative technology has been discouraged. We have no choice but to attempt to comply with the law, until it is changed.

Our lead time problems are better understood by members of Congress now, we think, than they were earlier. However, members of Congress must also appreciate that it, too, has a lead time problem in producing remedial legislation in a major area of regulation. That lead time requirement, is illustrated by passage of the Energy Supply and Environmental Coordination Act of 1974. Even for such a monumentally essential program as energy conservation, Congress took about six months after its first effort was vetoed, before final legislation was enacted.

We've developed some hard facts on the length of our lead time problems in the emissions reduction area. Attachment II explains this problem in some detail.

If the two lead time problems are considered together, one fact is clear to us. It is that Congress must begin to consider legislation now <sup>(1)</sup> to correct the 0.4 g/mi NO<sub>x</sub> error so that it may be enacted quickly enough to permit the industry to make consumer/beneficial decisions in the fall of this year with respect to hardware and tooling for 1978 models.

The Major Current Problem Facing the Auto Industry: Conflict Between Emissions Standards and Fuel Economy Requirements

As the more stringent levels of auto emissions control were reached, it became apparent to all that there is an inherent loss of fuel economy for each tightening of emission control standards with a given technology. Just comparing the efficiency of our cars currently sold in California with cars equipped for sale in the other 49 states shows a 10% penalty for California cars.

We are aware that the committee has extensive data on the subject. We would only emphasize at this time that as emissions approach the statutory limits, it is impossible to maintain present levels of fuel economy. Table 1 represents our experimental data to date.

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(1) More comment appears subsequently on other matters which should be part of the same legislation.

Table 1

## EMISSION STANDARDS AND PROJECTED FUEL ECONOMY

	<u>EMISSION STANDARD</u>			LOSS IN FUEL ECONOMY FROM 1975 <u>FEDERAL LEVEL<sup>(1)</sup></u>
	<u>HC</u>	<u>CO</u>	<u>NO<sub>x</sub></u>	%
	-- Grams/Mile --			
1975 Federal	1.5	15.0	3.1	(2)
1975 California	0.9	9.0	2.0	10
Administration's 5-Year Proposal	0.9	9.0	3.1	5-10
1977 Federal	1.5	15.0	2.0	5-10
1977 California Request	0.41	9.0	1.5	20-30
1978 Statutory	0.41	3.4	0.4	(3)
1982 EPA Proposal	0.41	3.4	2.0	10-20

NOTE A: Additional fuel economy losses due to the effect of EPA proposed selective enforcement audit regulation not included.

NOTE B: The imposition of an emission standard for sulfuric acid may require elimination of the catalytic converter at the time the sulfate standard becomes effective. If this happens, it will cause a reduction in fuel economy.

- (1) All fuel economy losses in this column could be reduced with numerous catalyst changes which are now not permitted by EPA as well as being impractical.
- (2) 1975 fuel economy of 15.5 mpg for GM cars is rated by EPA as 28% above 1974, based on EPA test data for the urban driving cycle.
- (3) Fuel economy projections cannot be calculated because control technology which would permit GM cars to meet all the requirements of the standards has not yet been developed. However, these levels have been attained experimentally through use of the dual catalyst and three-way catalyst systems with oxygen feedback control. Data from these systems indicates a minimal fuel economy loss, but in each case with completely unacceptable durability.



We have attempted to overcome the losses represented in Table 1 by changing other vehicle parameters such as weight and performance, but we have found that the extremely low emission standards still result in substantial fuel economy loss. Representatives of foreign manufacturers of small cars submitted testimony at recent EPA hearings in California which indicated support for this conclusion.<sup>(1)</sup>

With the passage of time, conditions that prevailed when the Clean Air Amendments of 1970 were passed have changed dramatically. At that time, the problem was thought to be a straightforward technical problem of engineering and developing control systems to reduce emissions from cars to protect public health. Now it has become clear that it is an exceedingly complex and interrelated public interest problem, involving energy conservation, inflation and recession factors.

Of course, the definition of "public interest" must always be based, primarily, on protecting public health. But, reduction of automotive caused air pollution should also be considered by Congress in relation to the other factors affecting public interest such as avoiding fuel

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<sup>(1)</sup> Testimony of Automobile Importers of America, by D. M. Schwenker for Honda, p. 148; Hanns Weisbarth, VW of America, pp. 165-169; Transcript of Environmental Protection Agency hearings on Waiver of federal preemption concerning 1977 California standards, April 29, 1975.

shortages now, preventing next month's inflation and restoring jobs and improving our nation's economy immediately. As always, Congress must consider many factors in order to determine on balance that combination which will best serve the public interest. Since safety and damageability regulations usually add weight to the new car -- and thus adversely affect fuel economy -- these bodies of regulatory law are also involved.

Unfortunately, it is all too easy to consider only one phase of the now complicated picture when seeking a solution to the impasse at which we've arrived with respect to motor vehicle emission standards and the other conflicting mandatory requirements. Since the degree of emissions control, and the timetable by which standards are imposed, impact fuel economy, inflation and recession in an important way, we cannot emphasize too strongly that Congress must carefully weigh all these factors in making long-term decisions to amend the Clean Air Act.

This broad spectrum should be important to the Committee because Congress has not authorized its implementing agency for clean air, the Environmental Protection Agency, to consider all the factors I have just suggested <sup>(1)</sup> -- either in —

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(1) Senate Public Works Committee letter to EPA Administrator Russel E. Train, December 20, 1974.

granting suspension or promulgating future standards. Similarly, agencies such as DOT, FEA or the Commerce Department, charged by Congress or the President with improving fuel economy, mandating safety and damageability equipment, or reversing inflationary/recession trends, apparently do not feel free to give emissions control matters meaningful weight in pursuing their mandated objectives.

Consequently, each agency appears to be pursuing its goals independently of the other in a segmented way which, in the case of the automobile and its regulatory burdens, is producing conflicting results that are not in the public interest. The fuel economy penalties illustrated in Table 1 are a classic example of this problem. The point is that this wasteful course will continue unless Congress takes corrective action now to avoid uncorrelated standards among the various regulatory agencies.

In view of the great national need in terms of energy conservation and this conflict in the control technologies, General Motors has recommended that a productive pause be legislated by Congress to permit a national correlation of these vital concerns, and to strike a balance, since for practical purposes we cannot have extreme control in all areas of concern at the same time.

Again, we emphasize that the guidelines which will ensure that this type of review and correlation takes place can come only from Congress. The Clean Air Act must be amended to provide the time Congress needs to accomplish its task and the auto industry the time it needs to accomplish its fuel economy and other objectives with the maximum public benefit assured.

The Need for a Five-Year Pause

GM earlier this year signed letters of commitment to make an all-out effort to achieve the Administration's energy or fuel savings goal of a sales-weighted average of 18.7 miles per gallon by 1980. (See Attachment III.) We are backing this commitment with a multi-billion dollar engineering, manufacturing and merchandising program so that we can sell a mix of smaller and lighter cars. As stated in letters to Secretary Morton, we believe we can meet this goal if the auto emission standards are no more stringent than those we are meeting with our current model vehicles, and provided no new safety and damageability standards impose weight penalties. Unfortunately, some Congressional committees are already considering accelerating this timetable.

Recent studies by General Motors have indicated that a five-year continuation of 1975 emission control levels would have only a slight effect on the quantities of automotive HC and CO emissions to the atmosphere. This is because new cars, with lower emissions, will gradually replace used cars which have either no controls or



less effective controls. More importantly, the current regulations being met are adequate to assure the continued decline in the quantities of these automotive-related emissions even assuming an increase in the number of vehicles on the road. Attachment IV graphically illustrates the slight difference in the quantities of these pollutants that would be emitted to the atmosphere nationally under the statutory standards compared with the five-year pause in the HC and CO emission standards (and eventually getting to statutory levels).

Since automotive emissions to the atmosphere are continuing to decline, and, since any health risk associated with these emissions would be correspondingly reduced, concern over the health effects of automotive pollutants should be allayed. Attachments V and VI indicate our reasons for believing that the current level of automotive control is adequate for all areas of the nation with the possible exception of Los Angeles and one or two other cities not in California.

It is important also to ensure that adequate stationary source emission control strategies are developed for  $\text{NO}_x$  control for those few cities that have a  $\text{NO}_x$  problem. It is apparent that the major contributors of  $\text{NO}_x$  emissions in those few problem cities are stationary sources, and that further control of automobiles will not yield significant benefits.

It is appropriate to note that control of stationary source pollution should be emphasized in future programs, in order to permit these sources to assume a heavier share of the total control effort that, up until now, has been borne by the auto.

It is also important that Congress consider the question of costs and benefits of emission control. We do not yet know exactly what it will cost to meet currently required 1978 standards for which we do not yet have the proven technology to achieve the 0.4 g/mi  $\text{NO}_x$  standard on production vehicles, with the capability of meeting the standard for 50,000 miles without a catalyst change. However, if we were required to choose a 1978 system at this time, it would most likely include components that would add approximately \$150 to \$340 -- depending on the system -- to the cost of the 1975 system (which already costs new car purchasers \$215 per car for emission control systems added to GM cars up through the 1975 models). These costs are projected to permit installation of either the dual or three-way catalyst system.

It should be noted that both oxidizing and reducing catalyst would be required, and, based on current technology, a catalyst change probably would be needed every 5,000 to 10,000 miles. Of course, current EPA regulations permit only one catalyst change in 50,000 miles. Estimated consumer cost for changing the oxidizing catalyst beads in current converters is \$60-\$70 and the cost for changing the reducing catalyst material is expected to exceed that cost by a considerable margin.

Having established above some reference points for judging the cost effectiveness of more stringent emission standards, it is important to consider the duration of a pause needed to achieve the balancing among the regulatory restraints.

Five years is suggested for the following additional reasons:

1. Our research and engineering efforts have necessarily been concentrated on the short run, while we have been simultaneously trying to develop the technology to meet the long-range emission standards. This has not permitted us to optimize consumer benefits, such as fuel economy and lower costs. However, if a five year pause is provided by Congress it will permit GM to avoid the wasteful crash-programming and plan for optimization of consumer interests in the following way:
  - a. The first 18 months would be used by GM engineers to concentrate on more fuel efficient engines and cars, through the 1981 models. This research and development would be directed towards meeting the EPA proposed 1982 standards.
  - b. At the end of the 18 months Congress should have available real world data from sulfate emissions roadside measurements and data and information on correlation of other mandatory

auto equipment standards to permit a final resolution of standards for 1982 and beyond. These 1982 and subsequent standards could be set by Congress after 18 months from enactment of the five year pause, but with the remaining period as sufficient lead time for the industry to move the new technologies to practical control hardware.

Under this plan, valuable manpower, facilities and material may be devoted to the goals which are in the public's best interest.

2. Since several major regulatory areas and various committee jurisdictions are involved to correlate the complex issues involved in setting the ultimate emission standards and achieving balance among emission control, fuel economy, safety and cost, we would estimate that Congress will need a considerable period of time to resolve these issues.

Following this time period, GM and other auto companies must respond in the lead time provided with whatever technology is necessary to meet the new labels of emission control.



3. While there are no data indicating that automotive sulfate emissions pose a present health threat, and while the likelihood that a health problem will develop in the future seems remote, leaving the emission standards at the present level would have the following advantage. As EPA has suggested, it would eliminate the need for further system modification which, in some cases, would increase sulfate emissions. This would minimize the concern about increasing problems from this source.

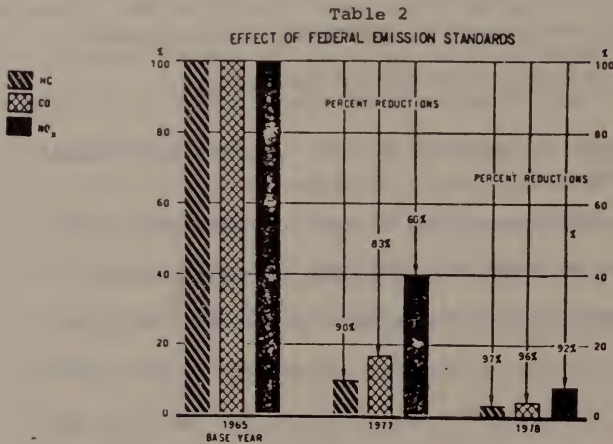
A pause at the current levels, if necessary, would also provide adequate time (a) for a complete evaluation of the sulfate emissions risk, or (b) for the development of appropriate control, whether that may be removal of sulfur from gasoline, utilization of different catalyst materials, development of automotive sulfur traps or recourse to noncatalyst control technology.

Performance of Catalytic Converter Systems -- 1977 Federal and California Standards

The catalytic converters used on new 1975 automobiles are helping automakers to improve gas mileage and driveability and are also significantly reducing exhaust emissions. Much of the unjustified criticism of catalytic converters ignores these important points. GM catalytic converters do the job they were intended to do.

New 1975 models have emissions which are reduced by 90% for hydrocarbons, 83% for carbon monoxide and 38% for oxides of nitrogen compared to an uncontrolled car. The 1977 standards increase the reduction of  $\text{NO}_x$  to 60% with HC and CO reductions remaining the same, assuming 1975 EPA regulations remain unchanged. However, this is currently not the case since EPA has proposed to impose Selective Enforcement Audit (SEA). If SEA is promulgated, it will mean that emissions performance will need to be reduced even lower than the standards require. Because of the necessity to accommodate production variations, the cars must be built so that the average emissions from all cars fall below the standards.

As shown in Table 2, achievement of the current standards will leave only minor fractions of pollutants remaining. Moreover, a substantial portion of all vehicles sold have emissions significant less than the maximum allowed in order to assure acceptable performance over 50,000 miles.



The catalytic converter does not now require any maintenance within the 50,000 miles, and perhaps farther, thus indicating its high effectiveness over a long period of time. We think this is a record of accomplishment in the technology of air pollution abatement unparalleled by any other industry in the world!

We intend to use the current system components, with some modifications, to meet the 1977 federal emission standards. Attachment VII is a copy of our testimony in Los Angeles, April 29, 1975, at the EPA Waiver Hearings, which explains our intention to comply in the best way possible with the more stringent California Waiver standards if the waiver is granted. In both cases -- federal and California -- we expect to incur additional fuel economy penalties.

#### Fuel Economy

In large measure because of the key role the catalytic converter plays in our 1975 control systems, we were able to recalibrate our engines to achieve a 28% improvement in fuel economy in our 1975 federal cars over our 1974 federal cars on the EPA urban cycle, according to EPA. We are proud of this major accomplishment.

In subsequent model years, we intend to continue to improve fuel economy by other alterations to the design of our GM passenger cars, primarily weight and size reduction. On a sales-weighted

basis, we project more than 50% improvement in fuel economy over 1974 GM cars by 1980 models except for vehicles produced for sale in California, assuming continuation of the 1975 federal auto emissions standards.

For a more complete description of the most extensive design change program in GM history -- to improve the fuel efficiency of our entire product line -- see Attachment VIII (page 4) from a statement by GM Chairman T. A. Murphy.

We feel these fuel economy improvements will permit a reduction in consumption of gasoline which will resolve the automotive share for the reasonably predictable future of the current energy conservation problem. These projections are plotted on curves shown on Attachments IX-A and IX-B.

Furthermore, we believe that a more accelerated fuel economy or pollution improvement program will likely result in more costly cars of unattractive small size and minimal function.

#### Sulfate Emissions

Much criticism of the catalytic converter has resulted from concern about sulfate emissions. Particularly disturbing was a preliminary "Issue Paper" by EPA released to the public in late January, 1975. This study claimed sulfate emissions from cars equipped with catalytic converters might threaten public health sometime in the future.



At GM we have examined all the data available on this point and believe (1) at this time sulfuric acid emissions from catalyst-equipped cars are at such low levels that they do not pose any present health hazard, and (2) that for the next several years, and probably for a great many more, the catalytic converter provides far greater public benefit through reduction of hydrocarbons and carbon monoxide, the risks of which are well-established, than it does public risk because of sulfates.

In a new preliminary EPA report, released April 3rd, information is presented which lessens the concern over future hazards, by questioning the validity of the model used in the January report to project possible future sulfate exposures. This recent report views sulfate exposure projections by several other groups, one of which was the California Air Resources Board. The April report points out that even after projecting emissions from ten years of converter-equipped cars, the sulfate levels in the atmosphere would be only about one half of the sulfate levels contained in the January report. Consequently, the April report says of the model used in the January study:

"The characteristics of the CO dispersion/physical activity model are such that exposure levels as high as those...are likely to be experienced in the ambient air very rarely, if at all."  
(emphasis added)

The April report continues that the January Issue Paper was projecting the "upper limit" of potential exposures because of a number of adverse conditions which were assumed. Some of the adverse conditions assumed were:

- (1) A freeway so wide that only about 16 miles of such road exist in the U.S.
- (2) A commuter who travels on such a road for 30 miles (less than 5% of commuters travel that far).
- (3) The protracted presence of low wind speeds and stable atmospheric conditions. In fact, such conditions are estimated to actually occur only 8 to 15 hours per year.
- (4) A prevailing wind which must blow at such an angle as to cause the maximum build up of sulfates over the entire 30 miles of the commuter trip.
- (5) Freeway traffic which travels at maximum capacity over the entire 30 mile commute, and yet which creates little or no turbulence.

Thus, while there is need for continuing study and monitoring, we believe that the available evidence and data show there is no present sulfate-related health danger to a driver, a passenger, a mechanic working on a converter-equipped car, or people who live close to heavily travelled expressways or commuters on them, either individually or collectively.

It would be unfortunate if unfounded health predictions or other exaggerations such as have been reported, succeed in undermining the public's confidence in the catalytic converter. For virtually all models in the GM product line, the catalytic converter is, at present, the most effective and most fuel-efficient emission control technology available to take the automobile out of the nation's air pollution problem.

GM Research Project Concerning Actual  
Roadside Sulfate Concentrations

In order to help evaluate the possible health risks resulting from concentrations of exhaust emissions along roadsides -- particularly sulfates -- General Motors recently announced that it will conduct a massive research experiment to obtain real world data. At our Milford, Michigan, Proving Ground facility we will measure actual atmospheric effects of emissions from a large fleet of automobiles with catalytic converters.

This project will involve a fleet of about 400 catalyst-equipped cars, driving on a four-lane test track with controlled traffic schedules to duplicate heaviest freeway traffic conditions. Extensive air sample measurements will be taken at a number of test points in the area, which will be analyzed to determine the levels and dispersion characteristics of the automobile emissions at various distances and heights from the roadway and under various meteorological conditions.

The U.S. Environmental Protection Agency is cooperating in the program and will review test procedures, provide some of the technical instrumentation and review test results and data. The California Air Resources Board is being consulted and other vehicle manufacturers are being asked to cooperate in order to make the test as productive as possible. We expect that this experiment will add much needed data to that which is now available so that a scientific prediction of vehicle sulfate emissions under real life traffic conditions may soon be made.

Illogical Relationship of Timetables in the Clean Air Amendments of 1970

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Testimony from organizations representing major cities and regional areas of the nation as to the difficulty in meeting primary air quality standards by 1975, or with permission from EPA by 1977, has highlighted the fact that effective dates in the original 1970 Act have turned out to be unrealistic. Congress has been forced to recognize this fact in remedial legislation it has passed, and EPA has recommended further corrective action.

However, these groups have not elaborated on the inconsistency which exists in the 1970 Act between the 1975 effective date for compliance with air quality standards and the 1975 date for the first-time installation of 90% controls on automobiles. It appears unrealistic to us, for Congress to expect cities to meet primary air quality standards in the 1975-77 time frame, when only a small



percentage of the cars on the road would be required to make their full 90% reduction to automotive pollutants.

To offset this situation, the Act authorized application of transportation control strategies to reduce vehicle miles travelled and encourage use of mass transit facilities. Unfortunately, in the short time frame available, air quality needs have dictated extreme transportation controls in some cities and have threatened worse ones in others. Congress has reacted to ease some of these extreme measures already, as in the case of reduced parking and charges for employee parking, parking management, etc.

It would appear much more reasonable to permit automotive controls to make their full contribution and take advantage of stationary source control programs already underway before forcing local areas to resort to overly stringent transportation control strategies to achieve compliance. This seems particularly reasonable in view of the fact that EPA data indicate that automotive related pollutants in the atmosphere are being reduced in practically every area of the country. When projected over the next ten years, the data indicate this progress without any further reduction in emission standards.

It is because of this unrealistic scheduling of compliance, we think, that has caused city and county representatives to testify<sup>(1)</sup>

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<sup>(1)</sup> This testimony also alleged certain problems with respect to (1) the time delay between ordering a transit bus and delivery, (2) GM's role in supplying transit buses and components. These questions are fully answered in Attachment X.

before this Subcommittee that their constituents are unfairly being asked to "take up the slack" for the automobile. In truth, Congress created an impossible situation with unrealistic deadlines for compliance -- on autos, cities and counties -- and the consequences present an urgent need for Congress to realistically correlate compliance schedules for all regulated entities under the Act.

Use of the suspension provisions for autos and administrative deferment for compliance with air quality standards have gone part way in remedying the situation. However, these provisions could not go far enough to avoid the impasse the auto industry faces or the frustrations expressed by representatives of the cities and counties earlier in these hearings. Obviously, the fundamental problems in timing now experienced under the Act must be corrected by new action by Congress.

Need for Congressional Mandate that a Continuing Review Take Place of Administrative Regulation from a Cost/Effectiveness Viewpoint

Our final recommendation is that Congress act now to provide guidelines for a continuing reevaluation, on a cost/benefit basis, of current and contemplated administrative regulations applicable to new vehicle emission standards. We realize that the tendency may exist to brush such a request aside because, conceivably, it could not be more than a "nuisance" to a large industrial corporation. Let me quickly emphasize that such is not the case. We do not oppose essential and effective administrative regulations, even though they might be burdensome and expensive.

However, we are involved in an entirely different matter.

This is a problem that has grown since 1970 to such dimension that public interest will suffer if the trend is not reversed.

For example, it cost General Motors and (ultimately consumers) \$24 million to comply with emission certification<sup>(1)</sup> regulations for just its 1975 models. Certification required testing for over a year of 284 hand-assembled, prototype experimental vehicles, for a total of over five million test miles and consuming over a half million gallons of gasoline. This effort also occupied the equivalent of 600 employees working full time for one year, and entailed the writing of over 3,300 letters -- 13 per working day -- just to keep track of the myriad details and requirements of the procedure.

This monumental requirement was necessary just to comply with the bureaucratic structure which has resulted from four year's of administrative interpretation by EPA as to what Congress intended by use of the word "certification" in the Clean Air Amendments of 1970.

As if such a requirement were not enough, EPA is now contemplating institution of a new redundant regulation called Selective

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<sup>(1)</sup> Testing for this certification is in addition to testing for other "certification" required by the Department of Transportation for compliance with federal motor vehicle safety standards -- brakes, bumper systems, etc. Moreover, additional testing is essential to assure that the automobile meets customer requirements.

Enforcement Audit, (SEA) which is a complex and cumbersome method of inspection of compliance of new cars as they come off the assembly line. See Attachment XI for brief statement of the major impact of SEA.

But this is not all. Field surveillance testing of compliance of cars in consumer use is now being pursued by EPA on a contract basis, and with inspection of new cars at the manufacturer facilities constitute two additional programs aimed at testing cars for compliance. And finally, EPA has indicated that it intends to push for state inspection of emissions reduction by vehicles in the hands of the public as they go through the state or local safety inspection lanes.

Thus, there are several overlapping government procedures which directly or indirectly affect our design emission levels for vehicle compliance, and as such have the same effect on vehicle costs and fuel economy as do more stringent statutory standards:

1. certification,
2. selective enforcement audit,
3. field surveillance,
4. EPA inspection of manufacturer facilities,
5. state and local emissions inspection.

Without belaboring the point of whether any one of these redundant procedures is unnecessary or constitutes an "overkill," in view of others that are in effect, we wish to point out that



such a likelihood is real. We further wish to emphasize that Congress must act now to provide for a continuing evaluation of all government regulation of the new product in order to prevent the duplication, wastefulness and overkill which everyone should want to avoid.

This is an extremely vital concern to us now, for the almost astronomical growth in detail and complexity of the certification procedure warns us that without a curb by Congress, "there is no end in sight."

We are attaching a paper which discusses the full weight of certification upon GM, as it related to certification of our 1975 models, (see Attachment XII).

In brief, we are forced to ask Congress: "How many times should a new car manufacturer have to demonstrate that its product meets overlapping government regulations in the sale, distribution and use of such products by the public?"

If Selective Enforcement Audit is implemented as proposed, then the severe impact of this regulation -- imposed so that it duplicates the already burdensome certification process -- will be extremely cost/ineffecitve and contrary to public interest. Similarly, if state safety inspection lanes can take over the cost burden carried by the federal government in its pilot field surveillance program, then this step should be taken in order to check compliance of vehicles in use in the most cost/beneficial manner.

In any case, however, it is unlikely that all these methods of assuring compliance are either necessary or practical. And there clearly comes a point beyond which the incremental costs of newly added procedures outweigh the minimal new benefit provided.

#### Summary and Conclusion

In summary, Mr. Chairman, we urge this Committee to give immediate attention to the need for a five-year productive pause in automotive regulations, during which time the government and the industry can fully evaluate the cost effectiveness of regulations -- existing and proposed -- and achieve the optimum balance among them.

A five-year continuation of 1975 emission control levels would have only a slight effect on the quantities of automotive emissions to the atmosphere and therefore with even less of an effect on health risk. Current regulations are adequate to assure the continued decline in the quantities of these automotive-related emissions, despite an increase in the number of vehicles on the road.

Secondly, the pause is essential if we are to attain the fuel economy goals that have been identified as necessary to lessen this nation's dependence on insecure foreign sources of oil. We can attain those goals without economic disruption and unemployment if the industry is not required to meet more stringent emission standards and safety standards that impose fuel economy penalties.

Third, the pause will provide the time needed for Congress to consider the complex issues involved in setting the ultimate emission standards and achieving balance among emission control, fuel economy and cost. The pause would provide time for deliberate consideration of these interrelated issues.

Fourth, the industry would be able to devote its resources to finding better, more cost effective ways of meeting future emission standards. In order to minimize the cost impact on the consumer, new and lower emission levels must be set far enough in the future to permit the industry to get away from costly "crash" programs just to meet short-term deadlines.

General Motors is committed to design and build the most fuel-efficient cars practicable in the next few years. We plan to take up to 700 pounds out of our full-size cars. We are developing new, more efficient transmissions. We are working to improve the efficiency and, therefore, the power requirements, of air conditioners and other accessories. And for the same reason, we are improving the aerodynamic design of our cars. These new model programs involving a commitment of billions of dollars are the most far reaching in the history of the automobile industry.

But our new cars, designed for energy efficiency as well as emission control, can make no contribution to either our energy goals or our clean air goals if the public doesn't buy them to

replace the older cars on the road. We are concerned that they will not buy them if more stringent emissions standards cancel out the fuel economy gains we are working so hard to achieve. The public also could be turned off by increased cost without an increase in perceived value or if they lack confidence in unproven emission control devices.

If the new cars do not sell, the normal replacement of the 100-million cars on the road will not occur. Gasoline consumption and emissions will not decline -- nor will safety objectives be achieved if these older vehicles continue on the road -- rather than the new, more pollution-free cars.

Equally important is the fact we now face in the market, that new car sales will decline, and unemployment -- throughout the economy -- will result.

Let me conclude with an observation GM has made on several previous occasions. We intend to be a part of the solution and not a part of the problem -- whether that problem is defined in terms of emissions, safety or energy. We have committed ourselves to an all-out effort. We have repeatedly indicated our desire to cooperate with the Congress and the Administration in the efficient realization of our national goals.



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## CHAPTER 15

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### EXTENSIONS OF CURRENT LAW

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# S. 1996

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## IN THE SENATE OF THE UNITED STATES

JUNE 23 (legislative day, JUNE 6), 1975

Mr. RANDOLPH (for himself, Mr. DOMENICI, and Mr. JACKSON) introduced the following bill; which was read twice and referred to the Committee on Interior and Insular Affairs

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## A BILL

To extend the Energy Supply and Environmental Coordination Act of 1974.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*  
3       That section 2 (f) (1) of the Energy Supply and Environ-  
4       mental Coordination Act of 1974 is amended by striking  
5       “June 30, 1975” and inserting “December 31, 1975”.

II

(73 51)

94TH CONGRESS  
1ST SESSION

# S. 2337

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IN THE HOUSE OF REPRESENTATIVES

SEPTEMBER 22, 1975

Referred to the Committee on Interstate and Foreign Commerce

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## AN ACT

To extend the Energy Supply and Environmental Coordination Act of 1974.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*  
3       That this Act may be cited as the "Coal Conversion Energy  
4       Supply and Environmental Coordination Act Amendments  
5       of 1975".

6       SEC. 2. Section 2 (f) (1) of the Energy Supply and  
7       Environmental Coordination Act of 1974 (Public Law 93-  
8       319, 88 Stat. 246) is amended by striking "June 30, 1975"  
9       and inserting in lieu thereof "December 31, 1975".

Passed the Senate September 19 (legislative day,  
September 11), 1975.

Attest:

FRANCIS R. VALEO,

*Secretary.*



Calendar No. 830

94TH CONGRESS  
2D SESSION**S. 3438**

[Report No. 94-873]

## IN THE SENATE OF THE UNITED STATES

MAY 13, 1976

Mr. RANDOLPH, from the Committee on Public Works, reported the following bill; which was read twice and ordered to be placed on the calendar

**A BILL**

To amend the Clean Air Act to authorize appropriations for research, development, and demonstration.

- 1      *Be it enacted by the Senate and House of Representa-*  
2      *tives of the United States of America in Congress assembled,*  
3      That section 104 (c) of the Clean Air Act is amended by  
4      striking the period at the end of the first sentence and add-  
5      ing the following: “, and \$148,194,700 for the fiscal year  
6      ending September 30, 1977.”.

II

## Calendar No. 830

94TH CONGRESS }  
2d Session }

SENATE

{ REPORT  
No. 94-873

## CLEAN AIR ACT RESEARCH AUTHORIZATION

MAY 12, 1976.—Ordered to be printed

MR. RANDOLPH, from the Committee on Public Works,  
submitted the following

## REPORT

[To accompany S. 3438]

The Committee on Public Works, reports an original bill (S. 3438) to amend the Clean Air Act to authorize appropriations for research, development, and demonstration, and recommends that the bill do pass.

## GENERAL STATEMENT

This bill amends the Clean Air Act to extend until September 30, 1977, the authorizations for the research, development, and demonstration programs of the Environmental Protection Agency carried on under the air pollution program. Previous authorizations for the air research programs expired on June 30, 1975.

The air pollution research program of the EPA is an important element of the overall Clean Air Act responsibilities of the Agency. These authorizations are necessary for the program to continue in fiscal year 1977.

The Committee has chosen to report research authorizations for this program in a separate bill amending the basic Act rather than as part of an overall environmental research bill. The Committee does not, however, favor separating research on individual environmental matters from other substantive legislation in the same area.

The Committee would prefer not to have single year authorizations for the research elements of environmental programs. This bill, however, contains only the authorizations for fiscal year 1977 in the interest of expediting consideration of these environmental research authorizations, which have already passed the House.

## ROLL CALL VOTES

There were no roll call votes during the Committee's consideration of this bill. The Committee ordered the bill reported by unanimous voice vote.

## COST OF LEGISLATION

Section 252(a)(1) of the Legislative Reorganization Act of 1970 requires publication in the report of the Committee's estimate of the costs of the reported legislation, together with estimates prepared by the Federal agency. Separate estimates of the cost of activities authorized by this bill were not prepared by any Federal agency.

This bill provides an authorization of \$148,194,700 for fiscal year 1977.

Section 403 of the Congressional Budget and Impoundment Control Act requires each bill to contain a statement of the cost of such bill prepared by the Congressional Budget Office. Because of time factors involved in meeting the May 15 deadline for reporting authorizing legislation for fiscal year 1977, this report does not contain the cost estimate.

## CHANGES IN EXISTING LAW

In the opinion of the Committee, it is necessary to dispense with the requirements of subsection (4) of rule XXIX of the Standing Rules of the Senate in order to expedite the business of the Senate.

London, 18th June 1864

My dear Mr. Stowe

I have just received your letter of the 14th inst. and am glad to hear that you are well. I am writing you a few lines to let you know that I am still in the land of the living. I am not feeling very well at present, but I am still able to write a few lines to you. I am still in the land of the living.

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## CHAPTER 16

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PRIOR EXISTING LAW (PUBLIC LAW 91-604,  
THE CLEAN AIR ACT OF 1970)

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# THE CLEAN AIR ACT<sup>1</sup>

## TITLE I—AIR POLLUTION PREVENTION AND CONTROL

### FINDINGS AND PURPOSES

Sec. 101. (a) The Congress finds—

42 U.S.C. 1857

(1) that the predominant part of the Nation's population is located in its rapidly expanding metropolitan and other urban areas, which generally cross the boundary lines of local jurisdictions and often extend into two or more States;

(2) that the growth in the amount and complexity of air pollution brought about by urbanization, industrial development, and the increasing use of motor vehicles, has resulted in mounting dangers to the public health and welfare, including injury to agricultural crops and livestock, damage to and the deterioration of property, and hazards to air and ground transportation;

(3) that the prevention and control of air pollution at its source is the primary responsibility of States and local governments; and

(4) that Federal financial assistance and leadership is essential for the development of cooperative Federal, State, regional, and local programs to prevent and control air pollution.

(b) The purposes of this title are—

(1) to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population;

(2) to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution;

(3) to provide technical and financial assistance to State and local governments in connection with the development and execution of their air pollution prevention and control programs; and

(4) to encourage and assist the development and operation of regional air pollution control programs.

### COOPERATIVE ACTIVITIES AND UNIFORM LAWS

SEC. 102. (a) The Administrator shall encourage cooperative activities by the States and local governments

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<sup>1</sup> Clean Air Act (42 U.S.C. 1857 et seq.) includes the Clean Air Act of 1963 (P.L. 88-206), and amendments made by the "Motor Vehicle Air Pollution Control Act"—P.L. 89-272 (October 20, 1965), the "Clean Air Act Amendments of 1966"—P.L. 89-675 (October 15, 1966), the "Air Quality Act of 1967"—P.L. 90-148 (November 21, 1967), the "Clean Air Amendments of 1970"—P.L. 91-604 (December 31, 1970), section 302 of P.L. 92-157 (November 18, 1971), and P.L. 93-15 (April 9, 1973).

(3)

for the prevention and control of air pollution; encourage the enactment of improved and, so far as practicable in the light of varying conditions and needs, uniform State and local laws relating to the prevention and control of air pollution; and encourage the making of agreements and compacts between States for the prevention and control of air pollution.

(b) The Administrator shall cooperate with and encourage cooperative activities by all Federal departments and agencies having functions relating to the prevention and control of air pollution, so as to assure the utilization in the Federal air pollution control program of all appropriate and available facilities and resources within the Federal Government.

(c) The consent of the Congress is hereby given to two or more States to negotiate and enter into agreements or compacts, not in conflict with any law or treaty of the United States, for (1) cooperative effort and mutual assistance for the prevention and control of air pollution and the enforcement of their respective laws relating thereto, and (2) the establishment of such agencies, joint or otherwise, as they may deem desirable for making effective such agreements or compacts. No such agreement or compact shall be binding or obligatory upon any State a party thereto unless and until it has been approved by Congress. It is the intent of Congress that no agreement or compact entered into between States after the date of enactment of the Air Quality Act of 1967, which relates to the control and abatement of air pollution in an air quality control region, shall provide for participation by a State which is not included (in whole or in part) in such air quality control region.

#### RESEARCH, INVESTIGATION, TRAINING, AND OTHER ACTIVITIES

42 U.S.C. 1857b

SEC. 103. (a) The Administrator shall establish a national research and development program for the prevention and control of air pollution and as part of such program shall—

(1) conduct, and promote the coordination and acceleration of, research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, and control of air pollution;

(2) encourage, cooperate with, and render technical services and provide financial assistance to air pollution control agencies and other appropriate public or private agencies, institutions, and organizations, and individuals in the conduct of such activities;



(3) conduct investigations and research and make surveys concerning any specific problem of air pollution in cooperation with any air pollution control agency with a view to recommending a solution of such problem, if he is requested to do so by such agency or if, in his judgment, such problem may affect any community or communities in a State other than that in which the source of the matter causing or contributing to the pollution is located;

(4) establish technical advisory committees composed of recognized experts in various aspects of air pollution to assist in the examination and evaluation of research progress and proposals and to avoid duplication of research.

(b) In carrying out the provisions of the preceding subsection the Administrator is authorized to—

(1) collect and make available, through publications and other appropriate means, the results of and other information, including appropriate recommendations by him in connection therewith, pertaining to such research and other activities;

(2) cooperate with other Federal departments and agencies, with air pollution control agencies, with other public and private agencies, institutions, and organizations, and with any industries involved, in the preparation and conduct of such research and other activities;

(3) make grants to air pollution control agencies, to other public or nonprofit private agencies, institutions, and organizations, and to individuals, for purposes stated in subsection (a) (1) of this section;

(4) contract with public or private agencies, institutions, and organizations, and with individuals, without regard to sections 3648 and 3709 of the Revised Statutes (31 U.S.C. 529; 41 U.S.C. 5) ;

(5) provide training for, and make training grants to, personnel of air pollution control agencies and other persons with suitable qualifications;

(6) establish and maintain research fellowships, in the Environmental Protection Agency and at public or nonprofit private educational institutions or research organizations;

(7) collect and disseminate, in cooperation with other Federal departments and agencies, and with other public or private agencies, institutions, and organizations having related responsibilities, basic data on chemical, physical, and biological effects of varying air quality and other information pertaining to air pollution and the prevention and control thereof; and

(8) develop effective and practical processes, methods, and prototype devices for the prevention or control of air pollution.

(c) In carrying out the provisions of subsection (a) of this section the Administrator shall conduct research on, and survey the results of other scientific studies on, the harmful effects on the health or welfare of persons by the various known air pollutants.

(d) The Administrator is authorized to construct such facilities and staff and equip them as he determines to be necessary to carry out his functions under this Act.

(e) If, in the judgment of the Administrator, an air pollution problem of substantial significance may result from discharge or discharges into the atmosphere, he may call a conference concerning this potential air pollution problem to be held in or near one or more of the places where such discharge or discharges are occurring or will occur. All interested persons shall be given an opportunity to be heard at such conference, either orally or in writing, and shall be permitted to appear in person or by representative in accordance with procedures prescribed by the Administrator. If the Administrator finds, on the basis of evidence presented at such conference, that the discharge or discharges if permitted to take place or continue are likely to cause or contribute to air pollution subject to abatement under section 115, he shall send such findings, together with recommendations concerning the measures which he finds reasonable and suitable to prevent such pollution, to the person or persons whose actions will result in the discharge or discharges involved; to air pollution agencies of the State or States and of the municipality or municipalities where such discharge or discharges will originate; and to the interstate air pollution control agency, if any, in the jurisdictional area of which any such municipality is located. Such findings and recommendations shall be advisory only, but shall be admitted together with the record of the conference, as part of the proceedings under subsections (b), (c), (d), (e), and (f) of section 115.

(f) (1) In carrying out research pursuant to this Act, the Administrator shall give special emphasis to research on the short- and long-term effects of air pollutants on public health and welfare. In the furtherance of such research, he shall conduct an accelerated research program—

(A) to improve knowledge of the contribution of air pollutants to the occurrence of adverse effects on health, including, but not limited to, behavioral physiological, toxicological, and biochemical effects; and

(B) to improve knowledge of the short- and long-term effects of air pollutants on welfare.

(2) In carrying out the provisions of this subsection the Administrator may—

(A) conduct epidemiological studies of the effects of air pollutants on mortality and morbidity;

(B) conduct clinical and laboratory studies on the immunologic, biochemical, physiological, and the toxicological effects including carcinogenic, teratogenic, and mutagenic effects of air pollutants;

(C) utilize, on a reimbursable basis, the facilities of existing Federal scientific laboratories and research centers;

(D) utilize the authority contained in paragraphs (1) through (4) of subsection (b); and

(E) consult with other appropriate Federal agencies to assure that research of studies conducted pursuant to this subsection will be coordinated with research and studies of such other Federal agencies.

(3) In entering into contracts under this subsection, the Administrator is authorized to contract for a term not to exceed 10 years in duration. For the purposes of this paragraph, there are authorized to be appropriated \$15,000,000. Such amounts as are appropriated shall remain available until expended and shall be in addition to any other appropriations under this Act.

#### RESEARCH RELATING TO FUELS AND VEHICLES

SEC. 104. (a) The Administrator shall give special emphasis to research and development into new and improved methods, having industrywide application, for the prevention and control of air pollution resulting from the combustion of fuels. In furtherance of such research and development he shall—

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(1) conduct and accelerate research programs directed toward development of improved, low-cost techniques for—

(A) control of combustion byproducts of fuels,

(B) removal of potential air pollutants from fuels prior to combustion,

(C) control of emissions from the evaporation of fuels,

(D) improving the efficiency of fuels combustion so as to decrease atmospheric emissions, and

(E) producing synthetic or new fuels which, when used, result in decreased atmospheric emissions.

(2) provide for Federal grants to public or non-profit agencies, institutions, and organizations and to individuals, and contracts with public or private agencies, institutions or persons, for payment of (A) part of the cost of acquiring, constructing, or otherwise securing for research and development purposes, new or improved devices or methods having industrywide application of preventing or controlling discharges into the air of various types of pollutants; (B) part of the cost of programs to develop low emission alternatives to the present internal combustion



engine; (C) the cost to purchase vehicles and vehicle engines, or portions thereof, for research, development, and testing purposes; and (D) carrying out the other provisions of this section, without regard to sections 3648 and 3709 of the Revised Statutes (31 U.S.C. 529; 41 U.S.C. 5) : *Provided*, That research or demonstration contracts awarded pursuant to this subsection or demonstration contracts awarded pursuant to this subsection (including contracts for construction) may be made in accordance with, and subject to the limitations provided with respect to research contracts of the military departments in, section 2353 of title 10, United States Code, except that the determination, approval, and certification required thereby shall be made by the Administrator: *Provided further*, That no grant may be made under this paragraph in excess of \$1,500,000;

(3) determine, by laboratory and pilot plant testing, the results of air pollution research and studies in order to develop new or improved processes and plant designs to the point where they can be demonstrated on a large and practical scale;

(4) construct, operate, and maintain, or assist in meeting the cost of the construction, operation, and maintenance of new or improved demonstration plants or processes which have promise of accomplishing the purposes of this Act;

(5) study new or improved methods for the recovery and marketing of commercially valuable by-products resulting from the removal of pollutants.

(b) In carrying out the provisions of this section, the Administrator may—

(1) conduct and accelerate research and development of low-cost instrumentation techniques to facilitate determination of quantity and quality of air pollutant emissions, including, but not limited to, automotive emissions;

(2) utilize, on a reimbursable basis, the facilities of existing Federal scientific laboratories;

(3) establish and operate necessary facilities and test sites at which to carry on the research, testing, development, and programing necessary to effectuate the purposes of this section;

(4) acquire secret processes, technical data, inventions, patent applications, patents, licenses, and an interest in lands, plants, and facilities, and other property or rights by purchase, license, lease, or donation; and

(5) cause on-site inspections to be made of promising domestic and foreign projects, and cooperate and participate in their development in instances in which the purposes of the Act will be served thereby.



(c) For the purposes of this section there are authorized to be appropriated \$75,000,000 for the fiscal year ending June 30, 1971, \$125,000,000 for the fiscal year ending June 30, 1972, and \$150,000,000 for the fiscal year ending June 30, 1973, \$150,000,000 for the fiscal year ending June 30, 1974, and \$150,000,000 for the fiscal year ending June 30, 1975. Amounts appropriated pursuant to this subsection shall remain available until expended.

GRANTS FOR SUPPORT OF AIR POLLUTION PLANNING  
AND CONTROL PROGRAMS

SEC. 105. (a) (1) (A) The Administrator may make grants to air pollution control agencies in an amount up to two-thirds of the cost of planning, developing, establishing, or improving, and up to one-half of the cost of maintaining, programs for the prevention and control of air pollution or implementation of national primary and secondary ambient air quality standards. 42 U.S.C. 1857c

(B) Subject to subparagraph (C), the Administrator may make grants to air pollution control agencies within the meaning of paragraph (1), (2), or (4) of section 302(b) in an amount up to three-fourths of the cost of planning, developing, establishing, or improving, and up to three-fifths of the cost of maintaining, any program for the prevention and control of air pollution or implementation of national primary and secondary ambient air quality standards in an area that includes two or more municipalities, whether in the same or different States.

(C) With respect to any air quality control region or portion thereof for which there is an applicable implementation plan under section 110, grants under subparagraph (B) may be made only to air pollution control agencies which have substantial responsibilities for carrying out such applicable implementation plan.

(2) Before approving any grant under this subsection to any air pollution control agency within the meaning of sections 302(b)(2) and 302(b)(4) the Administrator shall receive assurances that such agency provides for adequate representation of appropriate State, interstate, local, and (when appropriate) international, interests in the air quality control region.

(3) Before approving any planning grant under this subsection to any air pollution control agency within the meaning of sections 302(b)(2) and 302(b)(4), the Administrator shall receive assurances that such agency has the capability of developing a comprehensive air quality plan for the air quality control region, which plan shall include (when appropriate) a recommended system of alerts to avert and reduce the risk of situations in which there may be imminent and serious danger to the public health or welfare from air pollutants and the various aspects relevant to the establishment of air quality standards for such air quality control region, in-

cluding the concentration of industries, other commercial establishments, population and naturally occurring factors which shall affect such standards.

(b) From the sums available for the purposes of subsection (a) of this section for any fiscal year, the Administrator shall from time to time make grants to air pollution control agencies upon such terms and conditions as the Administrator may find necessary to carry out the purpose of this section. In establishing regulations for the granting of such funds the Administrator shall, so far as practicable, give due consideration to (1) the population, (2) the extent of the actual or potential air pollution problem, and (3) the financial need of the respective agencies. No agency shall receive any grant under this section during any fiscal year when its expenditures of non-Federal funds for other than nonrecurrent expenditures for air pollution control programs will be less than its expenditures were for such programs during the preceding fiscal year; and no agency shall receive any grant under this section with respect to the maintenance of a program for the prevention and control of air pollution unless the Administrator is satisfied that such grant will be so used as to supplement and, to the extent practicable, increase the level of State, local, or other non-Federal funds that would in the absence of such grant be made available for the maintenance of such program, and will in no event supplant such State, local, or other non-Federal funds. No grant shall be made under this section until the Administrator has consulted with the appropriate official as designated by the Governor or Governors of the State or States affected.

(c) Not more than 10 per centum of the total of funds appropriated or allocated for the purposes of subsection (a) of this section shall be granted for air pollution control programs in any one State. In the case of a grant for a program in an area crossing State boundaries, the Administrator shall determine the portion of such grant that is chargeable to the percentage limitation under this subsection for each State into which such area extends.

(d) The Administrator, with the concurrence of any recipient of a grant under this section, may reduce the payments to such recipient by the amount of the pay, allowances, traveling expenses, and any other costs in connection with the detail of any officer or employee to the recipient under section 301 of this Act, when such detail is for the convenience of, and at the request of, such recipient and for the purpose of carrying out the provisions of this Act. The amount by which such payments have been reduced shall be available for payment of such costs by the Administrator, but shall, for the purpose of determining the amount of any grant to a recipient under subsection (a) of this section, be deemed to have been paid to such agency.



## INTERSTATE AIR QUALITY AGENCIES OR COMMISSIONS

SEC. 106. For the purpose of developing implementation plans for any interstate air quality control region designated pursuant to section 107, the Administrator is authorized to pay, for two years, up to 100 per centum of the air quality planning program costs of any agency designated by the Governors of the affected States, which agency shall be capable of recommending to the Governors plans for implementation of national primary and secondary ambient air quality standards and shall include representation from the States and appropriate political subdivisions within the air quality control region. After the initial two-year period the Administrator is authorized to make grants to such agency in an amount up to three-fourths of the air quality planning program costs of such agency.

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## AIR QUALITY CONTROL REGIONS

SEC. 107. (a) Each State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State by submitting an implementation plan for such State which will specify the manner in which national primary and secondary ambient air quality standards will be achieved and maintained within each air quality control region in such State.

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(b) For purposes of developing and carrying out implementation plans under section 110—

(1) an air quality control region designated under this section before the date of enactment of the Clean Air Amendments of 1970, or a region designated after such date under subsection (c), shall be an air quality control region; and

(2) the portion of such State which is not part of any such designated region shall be an air quality control region, but such portion may be subdivided by the State into two or more air quality control regions with the approval of the Administrator.

(c) The Administrator shall, within 90 days after the date of enactment of the Clean Air Amendments of 1970, after consultation with appropriate State and local authorities, designate as an air quality control region any interstate area or major intrastate area which he deems necessary or appropriate for the attainment and maintenance of ambient air quality standards. The Administrator shall immediately notify the governors of the affected States of any designation made under this subsection.

## AIR QUALITY CRITERIA AND CONTROL TECHNIQUES

SEC. 108. (a) (1) For the purpose of establishing national primary and secondary ambient air quality stand-

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ards, the Administrator shall within 80 days after the date of enactment of the Clean Air Amendments of 1970 publish, and shall from time to time thereafter revise, a list which includes each air pollutant—

(A) which in his judgment has an adverse effect on public health and welfare;

(B) the presence of which in the ambient air results from numerous or diverse mobile or stationary sources; and

(C) for which air quality criteria had not been issued before the date of enactment of the Clean Air Amendments of 1970, but for which he plans to issue air quality criteria under this section.

(2) The Administrator shall issue air quality criteria for an air pollutant within 12 months after he has included such pollutant in a list under paragraph (1). Air quality criteria for an air pollutant shall accurately reflect the latest scientific knowledge useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air, in varying quantities. The criteria for an air pollutant, to the extent practicable, shall include information on—

(A) those variable factors (including atmospheric conditions) which of themselves or in combination with other factors may alter the effects on public health or welfare of such air pollutant;

(B) the types of air pollutants which, when present in the atmosphere, may interact with such pollutant to produce an adverse effect on public health or welfare; and

(C) any known or anticipated adverse effects on welfare.

(b)(1) Simultaneously with the issuance of criteria under subsection (a), the Administrator shall, after consultation with appropriate advisory committees and Federal departments and agencies, issue to the States and appropriate air pollution control agencies information on air pollution control techniques, which information shall include data relating to the technology and costs of emission control. Such information shall include such data as are available on available technology and alternative methods of prevention and control of air pollution. Such information shall also include data on alternative fuels, processes, and operating methods which will result in elimination or significant reduction of emissions.

(2) In order to assist in the development of information on pollution control techniques, the Administrator may establish a standing consulting committee for each air pollutant included in a list published pursuant to subsection (a)(1), which shall be comprised of technically qualified individuals representative of State and local governments, industry, and the academic community.



Each such committee shall submit, as appropriate, to the Administrator information related to that required by paragraph (1).

(c) The Administrator shall from time to time review, and, as appropriate, modify, and reissue any criteria or information on control techniques issued pursuant to this section.

(d) The issuance of air quality criteria and information on air pollution control techniques shall be announced in the Federal Register and copies shall be made available to the general public.

#### NATIONAL AMBIENT AIR QUALITY STANDARDS

##### SEC. 109. (a) (1) The Administrator—

(A) within 30 days after the date of enactment of the Clean Air Amendments of 1970, shall publish proposed regulations prescribing a national primary ambient air quality standard and a national secondary ambient air quality standard for each air pollutant for which air quality criteria have been issued prior to such date of enactment; and

(B) after a reasonable time for interested persons to submit written comments thereon (but no later than 90 days after the initial publication of such proposed standards) shall by regulation promulgate such proposed national primary and secondary ambient air quality standards with such modifications as he deems appropriate.

(2) With respect to any air pollutant for which air quality criteria are issued after the date of enactment of the Clean Air Amendments of 1970, the Administrator shall publish, simultaneously with the issuance of such criteria and information, proposed national primary and secondary ambient air quality standards for any such pollutant. The procedure provided for in paragraph (1) (B) of this subsection shall apply to the promulgation of such standards.

(b) (1) National primary ambient air quality standards, prescribed, under subsection (a) shall be ambient air quality standards the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health. Such primary standards may be revised in the same manner as promulgated.

(2) Any national secondary ambient air quality standard prescribed, under subsection (a) shall specify a level of air quality the attainment and maintenance of which in the judgment of the Administrator, based on such criteria, is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air. Such

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secondary standards may be revised in the same manner as promulgated.

#### IMPLEMENTATION PLANS

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**SEC. 110. (a) (1)** Each State shall, after reasonable notice and public hearings, adopt and submit to the Administrator, within nine months after the promulgation of a national primary ambient air quality standard (or any revision thereof) under section 109 for any air pollutant, a plan which provides for implementation, maintenance, and enforcement of such primary standard in each air quality control region (or portion thereof) within such State. In addition, such State shall adopt and submit to the Administrator (either as a part of a plan submitted under the preceding sentence or separately) within nine months after the promulgation of a national ambient air quality secondary standard (or revision thereof), a plan which provides for implementation, maintenance, and enforcement of such secondary standard in each air quality control region (or portion thereof) within such State. Unless a separate public hearing is provided, each State shall consider its plan implementing such secondary standard at the hearing required by the first sentence of this paragraph.

(2) The Administrator shall, within four months after the date required for submission of a plan under paragraph (1), approve or disapprove such plan for each portion thereof. The Administrator shall approve such plan, or any portion thereof, if he determines that it was adopted after reasonable notice and hearing and that—

(A) (i) in the case of a plan implementing a national primary ambient air quality standard, it provides for the attainment of such primary standard as expeditiously as practicable but (subject to subsection (e)) in no case later than three years from the date of approval of such plan (or any revision thereof to take account of a revised primary standard); and (ii) in the case of a plan implementing a national secondary ambient air quality standard, it specifies a reasonable time at which such secondary standard will be attained;

(B) it includes emission limitations, schedules, and timetables for compliance with such limitations, and such other measures as may be necessary to insure attainment and maintenance of such primary or secondary standard, including, but not limited to, land-use and transportation controls;

(C) it includes provision for establishment and operation of appropriate devices, methods, systems, and procedures necessary to (i) monitor, compile, and analyze data on ambient air quality and, (ii)

upon request, make such data available to the Administrator;

(D) it includes a procedure, meeting the requirements of paragraph (4), for review (prior to construction or modification) of the location of new sources to which a standard of performance will apply;

(E) it contains adequate provisions for intergovernmental cooperation, including measures necessary to insure that emissions of air pollutants from sources located in any air quality control region will not interfere with the attainment or maintenance of such primary or secondary standard in any portion of such region outside of such State or in any other air quality control region;

(F) it provides (i) necessary assurances that the State will have adequate personnel, funding, and authority to carry out such implementation plan, (ii) requirements for installation of equipment by owners or operators of stationary sources to monitor emissions from such sources, (iii) for periodic reports on the nature and amounts of such emissions; (iv) that such reports shall be correlated by the State agency with any emission limitations or standards established pursuant to this Act, which reports shall be available at reasonable times for public inspection; and (v) for authority comparable to that in section 303, and adequate contingency plans to implement such authority;

(G) it provides, to the extent necessary and practicable, for periodic inspection and testing of motor vehicles to enforce compliance with applicable emission standards; and

(H) it provides for revision, after public hearings, of such plan (i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of achieving such primary or secondary standard; or (ii) whenever the Administrator finds on the basis of information available to him that the plan is substantially inadequate to achieve the national ambient air quality primary or secondary standard which it implements.

(3) (A) The Administrator shall approve any revision of an implementation plan applicable to an air quality control region if he determines that it meets the requirements of paragraph (2) and has been adopted by the State after reasonable notice and public hearings.

(B) As soon as practicable, the Administrator shall, consistent with the purposes of this Act and the Energy Supply and Environmental Coordination Act of 1974,



review each State's applicable implementation plans and report to the State on whether such plans can be revised in relation to fuel burning stationary sources (or persons supplying fuel to such sources) without interfering with the attainment and maintenance of any national ambient air quality standard within the period permitted in this section. If the Administrator determines that any such plan can be revised, he shall notify the State that a plan revision may be submitted by the State. Any plan revision which is submitted by the State shall, after public notice and opportunity for public hearing, be approved by the Administrator if the revision relates only to fuel burning stationary sources (or persons supplying fuel to such sources), and the plan as revised complies with paragraph (2) of this subsection. The Administrator shall approve or disapprove any revision no later than three months after its submission.

(4) The procedure referred to in paragraph (2) (D) for review, prior to construction or modification, of the location of new sources shall (A) provide for adequate authority to prevent the construction or modification of any new source to which a standard of performance under section 111 will apply at any location which the State determines will prevent the attainment or maintenance within any air quality control region (or portion thereof) within such State of a national ambient air quality primary or secondary standard, and (B) require that prior to commencing construction or modification of any such source, the owner or operator thereof shall submit to such State such information as may be necessary to permit the State to make a determination under clause (A).

(b) The Administrator may, wherever he determines necessary, extend the period for submission of any plan or portion thereof which implements a national secondary ambient air quality standard for a period not to exceed eighteen months from the date otherwise required for submission of such plan.

(c) (1) The Administrator shall, after consideration of any State hearing record, promptly prepare and publish proposed regulations setting forth an implementation plan, or portion thereof, for a State if—

(A) The State fails to submit an implementation plan for any national ambient air quality primary or secondary standard within the time prescribed,

(B) the plan, or any portion thereof, submitted for such State is determined by the Administrator not to be in accordance with the requirements of this section, or

(C) the State fails, within 60 days after notification by the Administrator or such longer period as



he may prescribe, to revise an implementation plan as required pursuant to a provision of its plan referred to in subsection (a) (2) (H).

If such State held no public hearing associated with respect to such plan (or revision thereof), the Administrator shall provide opportunity for such hearing within such State on any proposed regulation. The Administrator shall, within six months after the date required for submission of such plan (or revision thereof), promulgate any such regulations unless, prior to such promulgation, such State has adopted and submitted a plan (or revision) which the Administrator determines to be in accordance with the requirements of this section.

(2) (A) The Administrator shall conduct a study and shall submit a report to the Committee on Interstate and Foreign Commerce of the United States House of Representatives and the Committee on Public Works of the United States Senate not later than three months after date of enactment of this paragraph on the necessity of parking surcharge, management of parking supply, and preferential bus/carpool lane regulations as part of the applicable implementation plans required under this section to achieve and maintain national primary ambient air quality standards. The study shall include an assessment of the economic impact of such regulations, consideration of alternative means of reducing total vehicle miles traveled, and an assessment of the impact of such regulations on other Federal and State programs dealing with energy or transportation. In the course of such study, the Administrator shall consult with other Federal officials including, but not limited to, the Secretary of Transportation, the Federal Energy Administrator, and the Chairman of the Council on Environmental Quality.

(B) No parking surcharge regulation may be required by the Administrator under paragraph (1) of this subsection as a part of an applicable implementation plan. All parking surcharge regulations previously required by the Administrator shall be void upon the date of enactment of this subparagraph. This subparagraph shall not prevent the Administrator from approving parking surcharges if they are adopted and submitted by a State as part of an applicable implementation plan. The Administrator may not condition approval of any implementation plan submitted by a State on such plan's including a parking surcharge regulation.

(C) The Administrator is authorized to suspend until January 1, 1975, the effective date or applicability of any regulations for the management of parking supply or any requirement that such regulations be a part of an applicable implementation plan approved or promulgated under this section. The exercise of the authority under this subparagraph shall not prevent the Admin-

istrator from approving such regulations if they are adopted and submitted by a State as part of an applicable implementation plan. If the Administrator exercises the authority under this subparagraph, regulations requiring a review or analysis of the impact of proposed parking facilities before construction which take effect on or after January 1, 1975, shall not apply to parking facilities on which construction has been initiated before January 1, 1975.

(D) For purposes of this paragraph—

(i) The term “parking surcharge regulation” means a regulation imposing or requiring the imposition of any tax, surcharge, fee, or other charge on parking spaces, or any other area used for the temporary storage of motor vehicles.

(ii) The term “management of parking supply” shall include any requirement providing that any new facility containing a given number of parking spaces shall receive a permit or other prior approval, issuance of which is to be conditioned on air quality considerations.

(iii) The term “preferential bus/carpool lane” shall include any requirement for the setting aside of one or more lanes of a street or highway on a permanent or temporary basis for the exclusive use of buses or carpools, or both.

(E) No standard, plan, or requirement, relating to management of parking supply or preferential bus/carpool lanes shall be promulgated after the date of enactment of this paragraph by the Administrator pursuant to this section, unless such promulgation has been subjected to at least one public hearing which has been held in the area affected and for which reasonable notice has been given in such area. If substantial changes are made following public hearings, one or more additional hearings shall be held in such area after such notice.

(d) For purposes of this Act, an applicable implementation plan is the implementation plan, or most recent revision thereof, which has been approved under subsection (a) or promulgated under subsection (c) and which implements a national primary or secondary ambient air quality standard in a State.

(e)(1) Upon application of a Governor of a State at the time of submission of any plan implementing a national ambient air quality primary standard, the Administrator may (subject to paragraph (2)) extend the three-year period referred to in subsection (a)(2)(A)(i) for not more than two years for an air quality control region if after review of such plan the Administrator determines that—

(A) one or more emission sources (or classes of moving sources) are unable to comply with the requirements of such plan which implement such primary standard because the necessary technology or other alternatives are not available or will not be available soon enough to permit compliance within such three-year period, and

(B) the State has considered and applied as a part of its plan reasonably available alternative means of attaining such primary standard and has justifiably concluded that attainment of such primary standard within the three years cannot be achieved.

(2) The Administrator may grant an extension under paragraph (1) only if he determines that the State plan provides for—

(A) application of the requirements of the plan which implement such primary standard to all emission sources in such region other than the sources (or classes) described in paragraph (1)(A) within the three-year period, and

(B) such interim measures of control of the sources (or classes) described in paragraph (1)(A) as the Administrator determines to be reasonable under the circumstances.

(f)(1) Prior to the date on which any stationary source or class of moving sources is required to comply with any requirement of an applicable implementation plan the Governor of the State to which such plan applies may apply to the Administrator to postpone the applicability of such requirement to such source (or class) for not more than one year. If the Administrator determines that—

(A) good faith efforts have been made to comply with such requirement before such date,

(B) such source (or class) is unable to comply with such requirement because the necessary technology or other alternative methods of control are not available or have not been available for a sufficient period of time,

(C) any available alternative operating procedures and interim control measures have reduced or will reduce the impact of such source on public health, and

(D) the continued operation of such source is essential to national security or to the public health or welfare,

then the Administrator shall grant a postponement of such requirement.



(2)(A) Any determination under paragraph (1) shall (i) be made on the record after notice to interested persons and opportunity for hearing, (ii) be based upon a fair evaluation of the entire record at such hearing, and (iii) include a statement setting forth in detail the findings and conclusions upon which the determination is based.

(B) Any determination made pursuant to this paragraph shall be subject to judicial review by the United States court of appeals for the circuit which includes such State upon the filing in such court within 30 days from the date of such decision of a petition by any interested person praying that the decision be modified or set aside in whole or in part. A copy of the petition shall forthwith be sent by registered or certified mail to the Administrator and thereupon the Administrator shall certify and file in such court the record upon which the final decision complained of was issued, as provided in section 2112 of title 28, United States Code. Upon the filing of such petition the court shall have jurisdiction to affirm or set aside the determination complained of in whole or in part. The findings of the Administrator with respect to questions of fact (including each determination made under subparagraphs (A), (B), (C), and (D) of paragraph (1)) shall be sustained if based upon a fair evaluation of the entire record at such hearing.

(C) Proceedings before the court under this paragraph shall take precedence over all the other causes of action on the docket and shall be assigned for hearing and decision at the earliest practicable date and expedited in every way.

(D) Section 307(a) (relating to subpoenas) shall be applicable to any proceeding under this subsection.

#### STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

42 U.S.C.  
1857c-6

SEC. 111. (a) For purposes of this section:

(1) The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction) the Administrator determines has been adequately demonstrated.

(2) The term "new source" means any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source.

(3) The term "stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant.



(4) The term "modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted.

(5) The term "owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

(6) The term "existing source" means any stationary source other than a new source.

(b) (1) (A) The Administrator shall, within 90 days after the date of enactment of the Clean Air Amendments of 1970, publish (and from time to time thereafter shall revise) a list of categories of stationary sources. He shall include a category of sources in such list if he determines it may contribute significantly to air pollution which causes or contributes to the endangerment of public health or welfare.

(B) Within 120 days after the inclusion of a category of stationary sources in a list under subparagraph (A), the Administrator shall publish proposed regulations, establishing Federal standards of performance for new sources within such category. The Administrator shall afford interested persons an opportunity for written comment on such proposed regulations. After considering such comments, he shall promulgate, within 90 days after such publication, such standards with such modifications as he deems appropriate. The Administrator may, from time to time, revise such standards following the procedure required by this subsection for promulgation of such standards. Standards of performance or revisions thereof shall become effective upon promulgation.

(2) The Administrator may distinguish among classes, types, and sizes within categories of new sources for the purpose of establishing such standards.

(3) The Administrator shall, from time to time, issue information on pollution control techniques for categories of new sources and air pollutants subject to the provisions of this section.

(4) The provisions of this section shall apply to any new source owned or operated by the United States.

(c) (1) Each State may develop and submit to the Administrator a procedure for implementing and enforcing standards of performance for new sources located in such State. If the Administrator finds the State procedure is adequate, he shall delegate to such State any authority he has under this Act to implement and enforce such standards (except with respect to new sources owned or operated by the United States).

(2) Nothing in this subsection shall prohibit the Administrator from enforcing any applicable standard of performance under this section.

(d) (1) The Administrator shall prescribe regulations which shall establish a procedure similar to that provided by section 110 under which each State shall submit to the Administrator a plan which (A) establishes emission standards for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under section 108(a) or 112(b)(1)(A) but (ii) to which a standard of performance under subsection (b) would apply if such existing source were a new source, and (B) provides for the implementation and enforcement of such emission standards.

(2) The Administrator shall have the same authority—

(A) to prescribe a plan for a State in cases where the State fails to submit a satisfactory plan as he would have under section 110(c) in the case of failure to submit an implementation plan, and

(B) to enforce the provisions of such plan in cases where the State fails to enforce them as he would have under sections 113 and 114 with respect to an implementation plan.

(e) After the effective date of standards of performance promulgated under this section, it shall be unlawful for any owner or operator of any new source to operate such source in violation of any standard of performance applicable to such source.

#### NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

42 U.S.C.  
1857e-7

SEC. 112. (a) For purposes of this section—

(1) The term "hazardous air pollutant" means an air pollutant to which no ambient air quality standard is applicable and which in the judgment of the Administrator may cause, or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

(2) The term "new source" means a stationary source the construction or modification of which is commenced after the Administrator proposes regulations under this section establishing an emission standard which will be applicable to such source.

(3) The terms "stationary source," "modification," "owner or operator" and "existing source" shall have the same meaning as such terms have under section 111(a).

(b) (1) (A) The Administrator shall, within 90 days after the date of enactment of the Clean Air Amendments of 1970, publish (and shall from time to time thereafter revise) a list which includes each hazardous air pollutant for which he intends to establish an emission standard under this section.

(B) Within 180 days after the inclusion of any air pollutant in such list, the Administrator shall publish proposed regulations establishing emission standards for such pollutant together with a notice of a public hearing within thirty days. Not later than 180 days after such publication, the Administrator shall prescribe an emission standard for such pollutant, unless he finds, on the basis of information presented at such hearings, that such pollutant clearly is not a hazardous air pollutant. The Administrator shall establish any such standard at the level which in his judgment provides an ample margin of safety to protect the public health from such hazardous air pollutant.

(C) Any emission standard established pursuant to this section shall become effective upon promulgation.

(2) The Administrator shall, from time to time, issue information on pollution control techniques for air pollutants subject to the provisions of this section.

(c) (1) After the effective date of any emission standard under this section—

(A) no person may construct any new source or modify any existing source which, in the Administrator's judgment, will emit an air pollutant to which such standard applies unless the Administrator finds that such source if properly operated will not cause emissions in violation of such standard, and

(B) no air pollutant to which such standard applies may be emitted from any stationary source in violation of such standard, except that in the case of an existing source—

(i) such standard shall not apply until 90 days after its effective date, and

(ii) the Administrator may grant a waiver permitting such source a period of up to two years after the effective date of a standard to comply with the standard, if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

(2) The President may exempt any stationary source from compliance with paragraph (1) for a period of not more than two years if he finds that the technology to implement such standards is not available and the operation of such source is required for reasons of national security. An exemption under this paragraph may be extended for one or more additional periods, each period not to exceed two years. The President shall make a report to Congress with respect to each exemption (or extension thereof) made under this paragraph.

(d) (1) Each State may develop and submit to the Administrator a procedure for implementing and enforcing emission standards for hazardous air pollutants for



stationary sources located in such State. If the Administrator finds the State procedure is adequate, he shall delegate to such State any authority he has under this Act to implement and enforce such standards (except with respect to stationary sources owned or operated by the United States).

(2) Nothing in this subsection shall prohibit the Administrator from enforcing any applicable emission standard under this section.

#### FEDERAL ENFORCEMENT

42 U.S.C.  
1857c-8

SEC. 113. (a) (1) Whenever, on the basis of any information available to him, the Administrator finds that any person is in violation of any requirement of an applicable implementation plan, the Administrator shall notify the person in violation of the plan and the State in which the plan applies of such finding. If such violation extends beyond the 30th day after the date of the Administrator's notification, the Administrator may issue an order requiring such person to comply with the requirements of such plan or he may bring a civil action in accordance with subsection (b).

(2) Whenever, on the basis of information available to him, the Administrator finds that violations of an applicable implementation plan are so widespread that such violations appear to result from a failure of the State in which the plan applies to enforce the plan effectively, he shall so notify the State. If the Administrator finds such failure extends beyond the thirtieth day after such notice, he shall give public notice of such finding. During the period beginning with such public notice and ending when such State satisfies the Administrator that it will enforce such plan (hereafter referred to in this section as "period of Federally assumed enforcement"), the Administrator may enforce any requirement of such plan with respect to any person—

(A) by issuing an order to comply with such requirement, or

(B) by bringing a civil action under subsection (b).

(3) Whenever, on the basis of any information available to him, the Administrator finds that any person is in violation of section 111(e) (relating to new source performance standards), 112(c) (relating to standards for hazardous emissions), or 119(g) (relating to energy-related authorities), or is in violation of any requirement of section 114 (relating to inspections, etc.), he may issue an order requiring such person to comply with such section or requirement, or he may bring a civil action in accordance with subsection (b).

(4) An order issued under this subsection (other than an order relating to a violation of section 112) shall not take effect until the person to whom it is issued has had an opportunity to confer with the Administrator con-



cerning the alleged violation. A copy of any order issued under this subsection shall be sent to the State air pollution control agency of any State in which the violation occurs. Any order issued under this subsection shall state with reasonable specificity the nature of the violation, specify a time for compliance which the Administrator determines is reasonable, taking into account the seriousness of the violation and any good faith efforts to comply with applicable requirements. In any case in which an order under this subsection (or notice to a violator under paragraph (1)) is issued to a corporation, a copy of such order (or notice) shall be issued to appropriate corporate officers.

(b) The Administrator may commence a civil action for appropriate relief, including a permanent or temporary injunction, whenever any person—

(1) violates or fails or refuses to comply with any order issued under subsection (a); or

(2) violates any requirement of an applicable implementation plan (A) during any period of Federally assumed enforcement, or (B) more than 30 days after having been notified by the Administration under subsection (a) (1) that such person is violating such requirement; or

(3) violates section 111(e), 112(c) or section 119 (g); or

(4) fails or refuses to comply with any requirement of section 114.

Any action under this subsection may be brought in the district court of the United States for the district in which the defendant is located or resides or is doing business, and such court shall have jurisdiction to restrain such violation and to require compliance. Notice of the commencement of such action shall be given to the appropriate State air pollution control agency.

(c) (1) Any person who knowingly—

(A) violates any requirement of an applicable implementation plan (i) during any period of Federally assumed enforcement, or (ii) more than 30 days after having been notified by the Administration under subsection (a) (1) that such person is violating such requirement, or

(B) violates or fails or refuses to comply with any order issued by the Administrator under subsection (a), or

(C) violates section 111(e), section 112(c), or section 119(g)

shall be punished by a fine of not more than \$25,000 per day of violation, or by imprisonment for not more than one year, or by both. If the conviction is for a violation committed after the first conviction of such person under this paragraph, punishment shall be by a fine of not more than \$50,000 per day of violation, or by imprisonment for not more than two years, or by both.

(2) Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this Act or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this Act, shall upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than six months, or by both.

#### INSPECTIONS, MONITORING, AND ENTRY

42 U.S.C.  
1857c-9

SEC. 114. (a) For the purpose (i) of developing or assisting in the development of any implementation plan under section 110 or 111(d), any standard of performance under section 111, or any emission standard under section 112(ii) of determining whether any person is in violation of any such standard or any requirement of such a plan, or (iii) carrying out section 119 or 303—

(1) the Administrator may require the owner or operator of any emission source to (A) establish and maintain such records, (B) make such reports, (C) install, use, and maintain such monitoring equipment or methods, (D) sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such manner as the Administrator shall prescribe), and (E) provide such other information, as he may reasonably require; and

(2) the Administrator or his authorized representative, upon presentation of his credentials—

(A) shall have a right of entry to, upon, or through any premises in which an emission source is located or in which any records required to be maintained under paragraph (1) of this section are located, and

(B) may at reasonable times have access to and copy any records, inspect any monitoring equipment or method required under paragraph (1), and sample any emissions which the owner or operator of such source is required to sample under paragraph (1).

(b) (1) Each State may develop and submit to the Administrator a procedure for carrying out this section in such State. If the Administrator finds the State procedure is adequate, he may delegate to such State any authority he has to carry out this section (except with respect to new sources owned or operated by the United States).

(2) Nothing in this subsection shall prohibit the Administrator from carrying out this section in a State.

(c) Any records, reports, or information obtained under subsection (a) shall be available to the public, except that upon a showing satisfactory to the Admin-

strator by any person that records, reports, or information, or particular part thereof, (other than emission data) to which the Administrator has access under this section if made public, would divulge methods or processes entitled to protection as trade secrets of such person, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 5 of the United States Code, except that such record, report, or information may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act or when relevant in any proceeding under this Act.

**ABATEMENT BY MEANS OF CONFERENCE PROCEDURE IN  
CERTAIN CASES**

**SEC. 115.** (a) The pollution of the air in any State or territories which endangers the health or welfare of any persons and which is covered by subsection (b) or (c) shall be subject to abatement as provided in this section. 42 U.S.C. 1857d

(b) (1) Whenever requested by the Governor of any State, a State air pollution control agency, or (with the concurrence of the Governor and the State air pollution control agency for the State in which the municipality is situated) the governing body of any municipality, the Administrator shall, if such request refers to air pollution which is alleged to endanger the health or welfare of persons in a State other than that in which the discharge or discharges (causing or contributing to such pollution) originate, give formal notification thereof to the air pollution control agency of the municipality where such discharge or discharges originate, to the air pollution control agency of the State in which such municipality is located, and to the interstate air pollution control agency, if any, in whose jurisdictional area such municipality is located, and shall call promptly a conference of such agency or agencies and of the air pollution control agencies of the municipalities which may be adversely affected by such pollution, and the air pollution control agency, if any, of each State, or for each area, in which any such municipality is located.

(2) Whenever requested by the Governor of any State, a State air pollution control agency, or (with the concurrence of the Governor and the State air pollution control agency for the State in which the municipality is situated) the governing body of any municipality, the Administrator shall, if such request refers to alleged air pollution which is endangering the health or welfare of persons only in the State in which the discharge or discharges (causing or contributing to such pollution) originate and if a municipality affected by such air pollution, or the municipality in which such pollution originates, has



either made or concurred in such request, give formal notification thereof to the State air pollution control agency, to the air pollution control agencies of the municipality where such discharge or discharges originate, and of the municipality or municipalities alleged to be adversely affected thereby, and to any interstate air pollution control agency, whose jurisdictional area includes any such municipality and shall promptly call a conference of such agency or agencies, unless in the judgment of the Administrator, the effect of such pollution is not of such significance as to warrant exercise of Federal jurisdiction under this section.

(3) The Administrator may, after consultation with State officials of all affected States, also call such a conference whenever, on the basis of reports, surveys, or studies, he has reason to believe that any pollution referred to in subsection (a) is occurring and is endangering the health and welfare of persons in a State other than that in which the discharge or discharges originate. The Administrator shall invite the cooperation of any municipal, State, or interstate air pollution control agencies having jurisdiction in the affected area on any surveys or studies forming the basis of conference action.

(4) A conference may not be called under this subsection with respect to an air pollutant for which (at the time the conference is called) a national primary or secondary ambient air quality standard is in effect under section 109.

(c) Whenever the Administrator, upon receipt of reports, surveys, or studies from any duly constituted international agency, has reason to believe that any pollution referred to in subsection (a) which endangers the health or welfare of persons in a foreign country is occurring, or whenever the Secretary of State requests him to do so with respect to such pollution which the Secretary of State alleges is of such a nature, the Administrator shall give formal notification thereof to the air pollution control agency of the municipality where such discharge or discharges originate, to the air pollution control agency of the State in which such municipality is located, and to the interstate air pollution control agency, if any, in the jurisdictional area of which such municipality is located, and shall call promptly a conference of such agency or agencies. The Administrator shall invite the foreign country which may be adversely affected by the pollution to attend and participate in the conference, and the representative of such country shall, for the purpose of the conference and any further proceeding resulting from such conference, have all the rights of a State air pollution control agency. This subsection shall apply only to a foreign country which the Administrator determines has given the United States essentially the same rights with respect to the prevention or control



of air pollution occurring in that country as is given that country by this subsection.

(d) (1) The agencies called to attend any conference under this section may bring such persons as they desire to the conference. The Administrator shall deliver to such agencies and make available to other interested parties, at least thirty days prior to any such conference, a Federal report with respect to the matters before the conference, including data and conclusions or findings (if any); and shall give at least thirty days' prior notice of the conference date to any such agency, and to the public by publication on at least three different days in a newspaper or newspapers of general circulation in the area. The chairman of the conference shall give interested parties an opportunity to present their views to the conference with respect to such Federal report, conclusions or findings (if any), and other pertinent information. The Administrator shall provide that a transcript be maintained of the proceedings of the conference and that a copy of such transcript be made available on request of any participant in the conference at the expense of such participant.

(2) Following this conference, the Administrator shall prepare and forward to all air pollution control agencies attending the conference a summary of conference discussions including (A) occurrence of air pollution subject to abatement under this Act; (B) adequacy of measures taken toward abatement of the pollution; and (C) nature of delays, if any, being encountered in abating the pollution.

(e) If the Administrator believes, upon the conclusion of the conference or thereafter, that effective progress toward abatement of such pollution is not being made and that the health or welfare of any persons is being endangered, he shall recommend to the appropriate State, interstate, or municipal air pollution control agency (or to all such agencies) that the necessary remedial action be taken. The Administrator shall allow at least six months from the date he makes such recommendations for the taking of such recommended action.

(f) (1) If, at the conclusion of the period so allowed, such remedial action or other action which in the judgment of the Administrator is reasonably calculated to secure abatement of such pollution has not been taken, the Administrator shall call a public hearing, to be held in or near one or more of the places where the discharge or discharges causing or contributing to such pollution originated, before a hearing board of five or more persons appointed by the Administrator. Each State in which any discharge causing or contributing to such pollution originates and each State claiming to be adversely affected by such pollution shall be given an opportunity to select one member of such hearing board and each

Federal department, agency, or instrumentality having a substantial interest in the subject matter as determined by the Administrator shall be given an opportunity to select one member of such hearing board, and one member shall be a representative of the appropriate interstate air pollution agency if one exists, and not less than a majority of such hearing board shall be persons other than officers or employees of the Environmental Protection Agency. At least three weeks' prior notice of such hearing shall be given to the State, interstate, and municipal air pollution control agencies called to attend such hearing and to the alleged polluter or polluters. All interested parties shall be given a reasonable opportunity to present evidence to such hearing board.

(2) On the basis of evidence presented at such hearing, the hearing board shall make findings as to whether pollution referred to in subsection (a) is occurring and whether effective progress toward abatement thereof is being made. If the hearing board finds such pollution is occurring and effective progress toward abatement thereof is not being made it shall make recommendations to the Administrator concerning the measures, if any, which it finds to be reasonable and suitable to secure abatement of such pollution.

(3) The Administrator shall send such findings and recommendations to the person or persons discharging any matter causing or contributing to such pollution; to air pollution control agencies of the State or States and of the municipality or municipalities where such discharge or discharges originate; and to any interstate air pollution control agency whose jurisdictional area includes any such municipality, together with a notice specifying a reasonable time (not less than six months) to secure abatement of such pollution.

(g) If action reasonably calculated to secure abatement of the pollution within the time specified in the notice following the public hearing is not taken the Administrator—

(1) in the case of pollution of air which is endangering the health or welfare of persons (A) in a State other than that in which the discharge or discharges (causing or contributing to such pollution) originate, or (B) in a foreign country which has participated in a conference called under subsection (c) of this section and in all proceedings under this section resulting from such conference, may request the Attorney General to bring a suit on behalf of the United States in the appropriate United States district court to secure abatement of the pollution.

(2) in the case of pollution of air which is endangering the health or welfare of persons only in the State in which the discharge or discharges (caus-

ing or contributing to such pollution) originate, at the request of the Governor of such State, shall provide such technical and other assistance as in his judgment is necessary to assist the State in judicial proceedings to secure abatement of the pollution under State or local law or, at the request of the Governor of such State, shall request the Attorney General to bring suit on behalf of the United States in the appropriate United States district court to secure abatement of the pollution.

(h) The court shall receive in evidence in any suit brought in a United States court under subsection (g) of this section a transcript of the proceedings before the board and a copy of the board's recommendations and shall receive such further evidence as the court in its discretion deems proper. The court, giving due consideration to the practicability of complying with such standards as may be applicable and to the physical and economic feasibility of securing abatement of any pollution proved, shall have jurisdiction to enter such judgment, and orders enforcing such judgment, as the public interest and the equities of the case may require.

(i) Members of any hearing board appointed pursuant to subsection (f) who are not regular full-time officers or employees of the United States shall, while participating in the hearing conducted by such board or otherwise engaged on the work of such board, be entitled to receive compensation at a rate fixed by the Administration, but not exceeding \$100 per diem, including traveltime, and while away from their homes or regular places of business they may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law (5 U.S.C. 73b-2) for persons in the Government service employed intermittently.

(j) (1) In connection with any conference called under this section, the Administrator is authorized to require any person whose activities result in the emission of air pollutants causing or contributing to air pollution to file with him, in such form as he may prescribe, a report, based on existing data, furnishing to the Administrator such information as may reasonably be required as to the character, kind, and quantity of pollutants discharged and the use of devices or other means to prevent or reduce the emission of pollutants by the person filing such a report. After a conference has been held with respect to any such pollution the Administrator shall require such reports from the person whose activities result in such pollution only to the extent recommended by such conference. Such report shall be made under oath or otherwise, as the Administrator may prescribe, and shall be filed with the Administrator within such reasonable period as the Administrator may prescribe, unless additional time be granted by the Administrator. No person shall be required in such report to divulge trade



secrets or secret processes and all information reported shall be considered confidential for the purposes of section 1905 of title 18 of the United States Code.

(2) If any person required to file any report under this subsection shall fail to do so within the time fixed by the Administrator for filing the same, and such failure shall continue for thirty days after notice of such default, such person shall forfeit to the United States the sum of \$100 for each and every day of the continuance of such failure, which forfeiture shall be payable into the Treasury of the United States, and shall be recoverable in a civil suit in the name of the United States brought in the district where such person has his principal office or in any district in which he does business: *Provided*, That the Administrator may upon application therefor remit or mitigate any forfeiture provided for under this subsection and he shall have authority to determine the facts upon all such applications.

(3) It shall be the duty of the various United States attorneys, under the direction of the Attorney General of the United States, to prosecute for the recovery of such forfeitures.

(k) No order or judgment under this section, or settlement, compromise, or agreement respecting any action under this section (whether or not entered or made before the date of enactment of the Clean Air Amendments of 1970) shall relieve any person of any obligation to comply with any requirement of an applicable implementation plan, or with any standard prescribed under section 111 or 112.

#### RETENTION OF STATE AUTHORITY

42 U.S.C.  
1857d-1

SEC. 116. Except as otherwise provided in sections 119 (c), (e), and (f), 209, 211(c)(4), and 233 (preempting certain State regulation of moving sources) nothing in this Act shall preclude or deny the right of any State or political subdivision thereof to adopt or enforce (1) any standard or limitation respecting emissions of air pollutants or (2) any requirement respecting control or abatement of air pollution; except that if an emission standard or limitation is in effect under an applicable implementation plan or under section 111 or 112, such State or political subdivision may not adopt or enforce any emission standard or limitation which is less stringent than the standard or limitation under such plan or section.

#### PRESIDENT'S AIR QUALITY ADVISORY BOARD AND ADVISORY COMMITTEES

42 U.S.C. 1857e

SEC. 117. (a)(1) There is hereby established in the Environmental Protection Agency an Air Quality Advisory Board, composed of the Administrator or his designee, who shall be Chairman, and fifteen members



appointed by the President, none of whom shall be Federal officers or employees. The appointed members, having due regard for the purposes of this Act, shall be selected from among representatives of various State, interstate, and local governmental agencies, of public or private interests contributing to, affected by, or concerned with air pollution, and of other public and private agencies, organizations, or groups demonstrating an active interest in the field of air pollution prevention and control, as well as other individuals who are expert in this field.

(2) Each member appointed by the President shall hold office for a term of three years, except that (A) any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term, and (B) the terms of office of the members first taking office pursuant to this subsection shall expire as follows: five at the end of one year after the date of appointment, five at the end of two years after such date, and five at the end of three years after such date, as designated by the President at the time of appointment, and (C) the term of any member under the preceding provisions shall be extended until the date on which his successor's appointment is effective. None of the members shall be eligible for reappointment within one year after the end of his preceding term, unless such term was for less than three years.

(b) The Board shall advise and consult with the Administrator on matters of policy relating to the activities and functions of the Administrator under this Act and make such recommendations as it deems necessary to the President.

(c) Such clerical and technical assistance as may be necessary to discharge the duties of the Board and such other advisory committees as hereinafter authorized shall be provided from the personnel of the Environmental Protection Agency.

(d) In order to obtain assistance in the development and implementation of the purposes of this Act including air quality criteria, recommended control techniques, standards, research and development, and to encourage the continued efforts on the part of industry to improve air quality and to develop economically feasible methods for the control and abatement of air pollution, the Administrator shall from time to time establish advisory committees. Committee members shall include, but not be limited to, persons who are knowledgeable concerning air quality from the standpoint of health, welfare, economics, or technology.

(e) The members of the Board and other advisory committees appointed pursuant to this Act who are not officers or employees of the United States while attending conferences or meetings of the Board or while other-

wise serving at the request of the Administrator, shall be entitled to receive compensation at a rate to be fixed by the Administrator, but not exceeding \$100 per diem, including traveltime, and while away from their homes or regular places of business they may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of title 5 of the United States Code for persons in the Government service employed intermittently.

(f) Prior to—

(1) issuing criteria for an air pollutant under section 108(a)(2),

(2) publishing any list under section 111(b)(1)(A) or 112(b)(1)(A),

(3) publishing any standard under section 111(b)(1)(B) or section 112(b)(1)(B), or

(4) publishing any regulation under section 202(a),

the Administrator shall, to the maximum extent practicable within the time provided, consult with appropriate advisory committees, independent experts, and Federal departments and agencies.

#### CONTROL OF POLLUTION FROM FEDERAL FACILITIES

43 U.S.C. 1657f

SEC. 118. Each department, agency, and instrumentality of the executive, legislative, and judicial branches of the Federal Government (1) having jurisdiction over any property or facility, or (2) engaged in any activity resulting, or which may result, in the discharge of air pollutants, shall comply with Federal, State, interstate, and local requirements respecting control and abatement of air pollution to the same extent that any person is subject to such requirements. The President may exempt any emission source of any department, agency, or instrumentality in the executive branch from compliance with such a requirement if he determines it to be in the paramount interest of the United States to do so, except that no exemption may be granted from section 111, and an exemption from section 112 may be granted only in accordance with section 112(c). No such exemption shall be granted due to lack of appropriation unless the President shall have specifically requested such appropriation as a part of the budgetary process and the Congress shall have failed to make available such requested appropriation. Any exemption shall be for a period not in excess of one year, but additional exemptions may be granted for periods of not to exceed one year upon the President's making a new determination. The President shall report each January to the Congress all exemptions from the requirements of this section granted during the preceding calendar year, together with his reason for granting each such exemption.

## ENERGY-RELATED AUTHORITY

SEC. 119. (a) For purposes of this section:

42 U.S.C.  
1857 c-10

(1) The term "stationary source fuel or emission limitation" means any emission limitation, schedule or timetable of compliance, or other requirement, which is prescribed under this Act (other than this section, or section 111(b), 112, or 303) or contained in an applicable implementation plan (other than a requirement imposed under authority described in section 110(a)(2)(F)(v)), and which limits, or is designed to limit, stationary source emissions resulting from combustion of fuels, including a prohibition on, or specification of, the use of any fuel of any type, grade, or pollution characteristic.

(2) The term "air pollution requirement" means any emission limitation, schedule or timetable for compliance, or other requirement, which is prescribed under any Federal, State, or local law or regulation, including this Act (except for any requirement prescribed under subsection (c) or (d) of this section, section 110(a)(2)(F)(v), or section 303), and which limits stationary source emissions resulting from combustion of fuels (including a prohibition on, or specification of, the use of any fuel of any type, grade, or pollution characteristic).

(3) The terms "stationary source" and "source" have the same meaning as the term "stationary source" has under section 111(a)(3); except that such terms include any owner or operator (as defined in section 111(a)(5)) of such source.

(4) The term "coal" includes coal derivatives.

(5) The term "primary standard condition" means a limitation, requirement, or other measure, prescribed by the Administrator under subsection (d)(2)(A) of this section.

(6) The term "regional limitation" means the requirement of subsection (c)(2)(D) of this section.

(b)(1)(A) The Administrator may, for any period beginning on or after the date of enactment of this section and ending on or before June 30, 1975, temporarily suspend any stationary source fuel or emission limitation as it applies to any person—

(i) if the Administrator finds that such person will be unable to comply with any such limitation during such period solely because of unavailability of types or amounts of fuels (unless such unavailability results from an order under section 2(a) of the Energy Supply and Environmental Coordination Act of 1974), or

(ii) if such person is a source which is described in subsection (c)(1)(A) or (B) of this section and which has converted to coal, and the Administrator



finds that the source will be able to comply during the period of the suspension with all primary standard conditions which will be applicable to such source.

Any suspension under this paragraph, the imposition of any interim requirement on which such suspension is conditioned under paragraph (3) of this subsection, and the imposition of any primary standard condition which relates to such suspension, shall be exempted from any procedural requirements set forth in this Act or in any other provision of Federal, State, or local law; except as provided in subparagraph (B) of this paragraph.

(B) The Administrator shall give notice to the public and afford interested persons an opportunity for written and oral presentations of data, views, and arguments prior to issuing a suspension under subparagraph (A), or denying an application for such a suspension, unless otherwise provided by the Administrator for good cause found and published in the Federal Register. In any case, before issuing such a suspension, he shall give actual notice to the Governor of the State in which the affected source or sources are located, and to appropriate local governmental officials (as determined by the Administrator). The issuing or denial of such a suspension, the imposition of an interim requirement, and the imposition of any primary standard condition shall be subject to judicial review only on the grounds specified in paragraph (2)(B), (2)(C), or (2)(D), of section 706 of title 5, United States Code, and shall not be subject to any proceeding under section 304(a)(2) or 307 (b) and (c) of this Act.

(2) In issuing any suspension under paragraph (1), the Administrator is authorized to act on his own motion or upon application by any person (including a public officer or public agency).

(3) Any suspension under paragraph (1) shall be conditioned upon compliance with such interim requirements as the Administrator determines are reasonable and practicable. Such interim requirements shall include, but need not be limited to, (A) a requirement that the persons receiving the suspension comply with such reporting requirements as the Administrator determines may be necessary, (B) such measures as the Administrator determines are necessary to avoid an imminent and substantial endangerment to health of persons, and (C) in the case of a suspension under paragraph (1)(A)(i), requirements that the suspension shall be inapplicable during any period during which fuels which would enable compliance with the suspended stationary source fuel or emission limitations are in fact reasonably available (as determined by the Administrator) to such person.

(c)(1) Except as provided in paragraph (2) of this subsection, the Administrator shall issue a compliance date extension to any fuel-burning stationary source—



(A) which is prohibited from using petroleum products or natural gas by reason of an order which is in effect under section 2 (a) and (b) of the Energy Supply and Environmental Coordination Act of 1974, or

(B) which the Administrator determines began conversion to the use of coal as its primary energy source during the period beginning on September 15, 1973, and ending on March 15, 1974,

and which, on or after September 15, 1973, converts to the use of coal as its primary energy source. If a compliance date extension is issued to a source, such source shall not, until January 1, 1979, be prohibited, by reason of the application of any air pollution requirement, from burning coal which is available to such source, except as provided in subsection (d)(3). For purposes of this paragraph, the term "began conversion" means action by the source during the period beginning on September 15, 1973, and ending on March 15, 1974 (such as entering into a contract binding on such source for obtaining coal, acquiring equipment or facilities to burn coal; expanding substantial sums to permit such source to burn coal; or applying for an air pollution variance to enable such source to burn coal) which the Administrator finds evidences a decision (made prior to March 15, 1974) to convert to burning coal as a result of the unavailability of an adequate supply of fuels required for compliance with the applicable implementation plan, and a good faith effort to expeditiously carry out such decision.

(2) (A) A compliance date extension under paragraph (1) of this subsection may be issued to a source only if—

(i) the Administrator finds that such source will not be able to burn coal which is available to such source in compliance with all applicable air pollution requirements without a compliance date extension.

(ii) the Administrator finds that the source will be able during the period of the compliance date extension to comply with all the primary standard conditions which are required under subsection (d)

(2) to be applicable to such source, and with the regional limitation if applicable to such source, and

(iii) the source has submitted to the Administrator a plan for compliance for such source which the Administrator has approved.

A plan submitted under clause (iii) of the preceding sentence shall be approved only if it meets the requirements of regulations prescribed under subparagraph (B). The Administrator shall approve or disapprove any such plan within 60 days after such plan is submitted.

(B) Not later than 90 days after the date of enactment of this section, the Administrator shall prescribe regulations requiring that any source to which a compliance date extension applies submit and obtain approval of its

means for and schedule of compliance with the requirements of subparagraph (C) of this paragraph. Such regulations shall include requirements that such schedule shall include dates by which any such source must—

(i) enter into contracts (or other obligations enforceable against such source) which the Administrator has approved as being adequate to provide for obtaining a long-term supply of coal which enables such source to achieve the emission reduction required by subparagraph (C), or

(ii) if coal which enables such source to achieve such emission reduction is not available to such source, enter into contracts (or other obligations enforceable against such source) which the Administrator has approved as being adequate to provide for obtaining (I) a long-term supply of other coal, and (II) continuous emission reduction systems necessary to permit such source to burn such coal, and to achieve the degree of emission reduction required by subparagraph (C).

Regulations under this subparagraph shall provide that contracts or other obligations required to be approved under this subparagraph must be approved before they are entered into (except that a contract or obligation which was entered into before the date of enactment of this section may be approved after such date).

(C) Regulations under subparagraph (B) shall require that the source achieve the most stringent degree of emission reduction that such source would have been required to achieve under the applicable implementation plan which was in effect on the date of submittal (under subparagraph (B) of this paragraph) of the means for and schedule of compliance (or if no applicable implementation plan was in effect on such date, under the first applicable implementation plan which takes effect after such date). Such degree of emission reduction shall be achieved as soon as practicable, but not later than December 31, 1978; except that, in the case of a source for which a continuous emission reduction system is required for sulfur-related emissions, reduction of such emissions shall be achieved on a date designated by the Administrator (but not later than January 1, 1979). Such regulations shall also include such interim requirements as the Administrator determines are reasonable and practicable, including requirements described in subparagraphs (A) and (B) of subsection (b)(3) and requirements to file progress reports.

(D) A source which is issued a compliance date extension under this subsection, and which is located in an air quality control region in which a national primary ambient air quality standard for an air pollutant is not being met, may not emit such pollutant in amounts which exceed any emission limitation (and may not violate any

other requirement) which applies to such source, under the applicable implementation plan for such pollutant. For purposes of this subparagraph, applicability of any such limitation or requirement to a source shall be determined without regard to this subsection or subsection (b).

(3) A source to which this subsection applies may, upon the expiration of a compliance date extension, receive a one-year postponement of the application of any requirement of an applicable implementation plan under the conditions and in the manner provided in section 110(f).

(4) The Administrator shall give notice to the public and afford an opportunity for oral and written presentations of data, views, and arguments before issuing any compliance date extension, prescribing any regulation under paragraph (2) of this subsection, making any finding under paragraph (2) (A) of this subsection, imposing any requirement on a source pursuant to paragraph (2) or any regulation thereunder, prescribing a primary standard condition under subsection (d) (2) which applies to a source to which an extension is issued under this subsection, or acting on any petition under subsection (d) (2) (C).

(d) (1) (A) Whenever the Federal Energy Administrator issues an order under section 2(a) of the Energy Supply and Environmental Coordination Act of 1974 which will not apply after June 30, 1975, the Administrator of the Environmental Protection Agency shall certify to him—

(i) in the case of a source to which no suspension will be issued under subsection (b), the earliest date on which such source will be able to burn coal and to comply with all applicable air pollution requirements, or

(ii) in the case of a source to which a suspension will be issued under subsection (b) of this section, the date determined under paragraph (2) (B) of this subsection.

(B) Whenever the Federal Energy Administrator issues an order under section 2(a) of such Act which will apply after June 30, 1975, the Administrator of the Environmental Protection Agency shall notify him if such source will be able, on and after July 1, 1975, to burn coal and to comply with all applicable air pollution requirements without a compliance date extension under subsection (c). If such notification is not given—

(i) in the case of a source which is eligible for a compliance date extension under subsection (c), the Administrator of the Environmental Protection Agency shall certify to the Federal Energy Administrator the date determined under paragraph (2) (B) of this subsection, and



(ii) in the case of a source which is not eligible for such an extension, the Administrator of the Environmental Protection Agency shall certify to the Federal Energy Administrator the earliest date on which the source will be able to burn coal and to comply with all applicable air pollution requirements.

(2)(A) The Administrator of the Environmental Protection Agency, after consultation with appropriate States, shall prescribe (and may from time to time, after such consultation, modify) emission limitations, requirements respecting pollution characteristics of coal, or other enforceable measures for control of emissions, for each source to which a suspension under subsection (b)(1)(A)(ii) will apply, and for each source to which a compliance date extension under subsection (c)(1) will apply. Such limitations, requirements, and measures shall be those which he determines must be complied with by the source in order to assure (throughout the period that the suspension or extension will be in effect) that the burning of coal by such source will not result in emissions which cause or contribute to concentrations of any air pollutant in excess of any national primary ambient air quality standard for such pollutant.

(B) Whenever the Administrator prescribes a limitation, requirement, or measure under subparagraph (A) of this paragraph with respect to a source, he shall determine the earliest date on which such source will be able to comply with such limitation, requirement, or measure, and with any regional limitation applicable to such source.

(C) An air pollution control agency may petition the Administrator (A) to modify any limitation, requirement, or other measure under this paragraph so as to assure compliance with the requirements of this paragraph, or (B) to issue to the Federal Energy Administration the certification described in paragraph (3)(B) on the grounds described in clause (iii) thereof. The Administrator shall take the action requested in the petition, or deny the petition, within 90 days after the date of receipt of the petition.

(3)(A) If the Administrator determines that a source to which a suspension under subsection (b)(1)(A)(ii) or to which a compliance date extension under subsection (c)(1) applies is not in compliance with any primary standard condition, or that a source to which a compliance date extension applies is not in compliance with a regional limitation applicable to it, he shall (except as provided in subparagraph (B)) either—

(i) enforce compliance with such condition or limitation under section 113, or

(ii) (after notice to the public and affording an opportunity for interested persons to present data, views, and arguments, including oral presentations,



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to the extent practicable) revoke such suspension or compliance date extension.

(B) If the Administrator finds that for any period—

(i) a source, to which an order under section 2(a) of the Energy Supply and Environmental Coordination Act of 1974 applies, will be unable to comply with a primary standard condition or regional limitation,

(ii) such a source will not be compliance with such a condition or limitation, but such condition or limitation cannot be enforced because of a court order restraining its enforcement, or

(iii) the burning of coal by such a source will result in an increase in emissions of any air pollutant for which national ambient air quality standards have not been promulgated (or an air pollutant which is transformed in the atmosphere into an air pollutant for which such a standard has not been promulgated), and that such increase may cause (or materially contribute to) a significant risk to public health,

he shall notify the Federal Energy Administrator of his finding and certify the period for which such order under such section 2(a) shall not be in effect with respect to such source. Subject to the conditions of the preceding sentence, such certification may be modified from time to time. For purposes of this subsection, subsection (c), and section 2(a) or (b) of the Energy Supply and Environmental Coordination Act of 1974, a source shall be considered unable to comply with an air pollution requirement (including a primary standard condition or regional limitation) only if necessary technology or other alternative methods of control are not available or have not been available for a sufficient period of time.

(4) Nothing in this Act shall prohibit a State, political subdivision of a State, or agency or instrumentality of either, from enforcing any primary standard condition or regional limitation.

(5) A conversion to coal (A) to which a suspension under subsection (b) or a compliance date extension under subsection (c) applies or (B) by reason of an order under section 2(a) of the Energy Supply and Environmental Coordination Act of 1974 shall not be deemed to be a modification for purposes of section 111(a) (2) and (4) of this Act.

(e) The Administrator may, by rule, establish priorities under which manufacturers of continuous emission reduction systems necessary to carry out subsection (c) shall provide such systems to users thereof, if he finds that priorities must be imposed in order to assure that such systems are first provided to sources in air quality control regions in which national primary ambient air quality standards have not been achieved. No rule under

this subsection may impair the obligation of any contract entered into before the date of enactment of this section. To the extent necessary to carry out this section, the Administrator may prohibit any State or political subdivision of a State, or an agency or instrumentality of either, from requiring any person to use a continuous emission reduction system for which priorities have been established under this subsection, except in accordance with such priorities.

(f) No State, political subdivision of a State, or agency or instrumentality of either, may require any person to whom a suspension has been issued under subsection (b)(1) to use any fuel the unavailability of which is the basis of such person's suspension (except that this subsection shall not apply to requirements identical to Federal requirements under subsection (b)(3) or subsection (d)(2)).

(g)(1) It shall be unlawful for any person to whom a suspension has been issued under subsection (b)(1) to violate any requirement on which the suspension is conditioned pursuant to subsection (b)(3) or any primary standard condition applicable to him.

(2) It shall be unlawful for any person to fail to comply with any requirement under subsection (c), or any regulation, plan, or schedule thereunder (including a primary standard condition or regional limitation), which is applicable to such person.

(3) It shall be unlawful for any person to violate any rule under subsection (e).

(4) It shall be unlawful for any person to fail to comply with an interim requirement under subsection (i)(3).

(h) Nothing in this section shall affect the power of the Administrator to deal with air pollution presenting an imminent and substantial endangerment to the health of persons under section 303 of this Act.

(i)(1) In order to reduce the likelihood of early phase-out of existing electric generating powerplants, any electric generating powerplant (A) which, because of the age and condition of the plant, is to be taken out of service permanently no later than January 1, 1980, according to the power supply plan (in existence on January 1, 1974) of the owner or operator of such plant, (B) for which a certification to that effect has been filed by the owner or operator of the plant with the Environmental Protection Agency and the Federal Power Commission, and (C) for which such Commission has determined that the certification has been made in good faith and that the plan to cease operations no later than January 1, 1980, will be carried out as planned in light of existing and prospective power supply requirements, shall be eligible for a single one-year postponement as provided in paragraph (2).

(2) Prior to the date on which any powerplant eligible under paragraph (1) is required to comply with any requirement of an applicable implementation plan, such plant may apply (with the concurrence of the Governor of the State in which such plant is located) to the Administrator to postpone the applicability of such requirement to such plant for not more than one year. If the Administrator determines, after considering the risk to public health and welfare which may be associated with a postponement, that compliance with any such requirement is not reasonable in light of the projected useful life of the plant, the availability of rate base increases to pay for the costs of such compliance and other appropriate factors, then the Administrator shall grant a postponement of any such requirement.

(3) The Administrator shall, as a condition of any postponement under paragraph (2), prescribe such interim requirements as are practicable and reasonable in light of the criteria in paragraph (2).

(j) (1) The Administrator may, after public notice and opportunity for presentation of data, views, and arguments in accordance with section 553 of title 5, United States Code, and after consultation with the Federal Energy Administrator, designate persons with respect to whom fuel exchange requirements should be imposed under paragraph (2) of this subsection. The purpose of such designation shall be to avoid or minimize the adverse impact on public health and welfare of any suspension under subsection (b) of this section or conversion to coal to which subsection (c) applies or of any allocation under section 2(d) of the Energy Supply and Environmental Coordination Act of 1974 or under the Emergency Petroleum Allocation Act of 1973.

(2) The Federal Energy Administrator shall exercise his authority under section 2(d) of the Energy Supply and Environmental Coordination Act of 1974 and under the Emergency Petroleum Allocation Act of 1973 with respect to persons designated by the Administrator of the Environmental Protection Agency under paragraph (1) in order to require the exchange of any fuel subject to allocation under such Acts effective no later than forty-five days after the date of such designation, unless the Federal Energy Administrator determines, after consultation with the Administrator of the Environmental Protection Agency, that the costs or consumption of fuel, resulting from requiring such exchange, will be excessive.

(k) (1) The Administrator shall study, and report to Congress not later than six months after the date of enactment of this section, with respect to—

(A) the present and projected impact of fuel shortages and fuel allocation programs on the program under this Act;



(B) availability of continuous emission reduction technology (including projections respecting the time, cost, and number of units available) and the effects that continuous emission reduction systems would have on the total environment and on supplies of fuel and electricity;

(C) the number of sources and locations which must use such technology based on projected fuel availability data;

(D) a priority schedule for installation of continuous emission reduction technology, based on public health or air quality;

(E) evaluation of availability of technology to burn municipal solid waste in electric powerplants or other major fuel burning installations, including time schedules, priorities, analysis of pollutants which may be emitted (including those for which national ambient air quality standards have not been promulgated), and a comparison of health benefits and detriments from burning solid waste and of economic costs;

(F) evaluation of alternative control strategies for the attainment and maintenance of national ambient air quality standards for sulfur oxides within the time for attainment prescribed in this Act, including associated considerations of cost, time for attainment, feasibility, and effectiveness of such alternative control strategies as compared to stationary source fuel and emission regulations;

(G) proposed priorities, for continuous emission reduction systems which do not produce solid waste, for sources which are least able to handle solid waste byproducts of such systems;

(H) plans for monitoring or requiring sources to which this section applies to monitor the impact of actions under this section on concentrations of sulfur dioxide in the ambient air; and

(I) steps taken pursuant to authority of section 110(a)(3)(B) of this Act.

(2) Beginning January 1, 1975, the Administrator shall publish in the Federal Register, at no less than one-hundred-and-eighty-day intervals, the following:

(A) A concise summary of progress reports which are required to be filed by any person or source owner or operator to which subsection (c) applies. Such progress reports shall report on the status of compliance with all requirements which have been imposed by the Administrator under such subsection.

(B) Up-to-date findings on the impact of this section upon—

- (i) applicable implementation plans, and
- (ii) ambient air quality.



## TITLE II—EMISSION STANDARDS FOR MOVING SOURCES

### SHORT TITLE

SEC. 201. This title may be cited as the "National Emission Standards Act." 42 U.S.C.  
1857f-1 note

### PART A—MOTOR VEHICLE EMISSION AND FUEL STANDARDS

#### ESTABLISHMENT OF STANDARDS

SEC. 202. (a) Except as otherwise provided in subsection (b)— 42 U.S.C.  
1857f-1

(1) The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment causes or contributes to, or is likely to cause or to contribute to, air pollution which endangers the public health or welfare. Such standards shall be applicable to such vehicles and engines for their useful life (as determined under subsection (d)), whether such vehicles and engines are designed as complete systems or incorporate devices to prevent or control such pollution.

(2) Any regulation prescribed under this subsection (and any revision thereof) shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.

(b)(1)(A) The regulations under subsection (a) applicable to emissions of carbon monoxide and hydrocarbons from light-duty vehicles and engines manufactured during model years 1975 and 1976 shall contain standards which are identical to the interim standards which were prescribed (as of December 1, 1973) under paragraph (5)(A) of this subsection for light-duty vehicles and engines manufactured during model year 1975. The regulations under subsection (a) applicable to emissions of carbon monoxide and hydrocarbons from light-duty vehicles and engines manufactured during or after model year 1977 shall contain standards which require

a reduction of at least 90 percentum from emissions of carbon monoxide and hydrocarbons allowable under the standards under this section applicable to light-duty vehicles and engines manufactured in model year 1970.

(B) The regulations under subsection (a) applicable to emissions of oxides of nitrogen from light-duty vehicles and engines manufactured during model years 1975 and 1976 shall contain standards which are identical to the standards which were prescribed (as of December 1, 1973) under subsection (a) for light-duty vehicles and engines manufactured during model year 1975. The regulations under subsection (a) applicable to emissions of oxides of nitrogen from light-duty vehicles and engines manufactured during model year 1977 shall contain standards which provide that such emissions from such vehicles and engines may not exceed 2.0 grams per vehicle mile. The regulations under subsection (a) applicable to emissions of oxides of nitrogen from light-duty vehicles and engines manufactured during or after model year 1978 shall contain standards which require a reduction of at least 90 per centum from the average of emissions of oxides of nitrogen actually measured from light-duty vehicles manufactured during model year 1971 which are not subject to any Federal or State emission standard for oxides of nitrogen. Such average of emissions shall be determined by the Administrator on the basis of measurements made by him.

(2) Emission standards under paragraph (1), and measurement techniques on which such standards are based (if not promulgated prior to the date of enactment of the Clear Air Amendments of 1970), shall be prescribed by regulation within 180 days after such date.

(3) For purposes of this part—

(A)(i) The term "model year" with reference to any specific calendar year means the manufacturer's annual production period (as determined by the Administrator) which includes January 1 of such calendar year. If the manufacturer has no annual production period, the term "model year" shall mean the calendar year.

(ii) For the purpose of assuring that vehicles and engines manufactured before the beginning of a model year were not manufactured for purposes of circumventing the effective date of a standard required to be prescribed by subsection (b), the Administrator may prescribe regulations defining "model year" otherwise than as provided in clause (i).

(B) The term "light duty vehicles and engines" means new light duty motor vehicles and new light duty motor vehicle engines, as determined under regulations of the Administrator.

(4) On July 1 of 1971, and of each year thereafter, the Administrator shall report to the Congress with respect to the development of systems necessary to implement the emission standards established pursuant to this section. Such reports shall include information regarding the continuing effects of such air pollutants subject to standards under this section on the public health and welfare, the extent and progress of efforts being made to develop the necessary systems, the costs associated with development and application of such systems, and following such hearings as he may deem advisable, any recommendations for additional congressional action necessary to achieve the purposes of this Act. In gathering information for the purposes of this paragraph and in connection with any hearing, the provisions of section 307(a) (relating to subpoenas) shall apply.

(5) (A) At any time after January 1, 1975, any manufacturer may file with the Administrator an application requesting the suspension for one year only of the effective date of any emission standard required by paragraph (1)(A) with respect to such manufacturer for light-duty vehicles and engines manufactured in model year 1977. The Administrator shall make his determination with respect to any such application within sixty days. If he determines, in accordance with the provisions of this subsection, that such suspension should be granted, he shall simultaneously with such determination prescribe by regulation interim emission standards which shall apply (in lieu of the standards required to be prescribed by paragraph (1)(A) of this subsection) to emissions of carbon monoxide or hydrocarbons (or both) from such vehicles and engines manufactured during model year 1977.

(B) Any interim standards prescribed under this paragraph shall reflect the greatest degree of emission control which is achievable by application of technology which the Administrator determines is available, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers.

(C) Within 60 days after receipt of the application for any such suspension, and after public hearing, the Administrator shall issue a decision granting or refusing such suspension. The Administrator shall grant such suspension only if he determines that (i) such suspension is essential to the public interest or the public health and welfare of the United States, (ii) all good faith efforts have been made to meet the standards established by this subsection, (iii) the applicant has established that effective control technology, processes, operating methods, or other alternatives are not available or have not been available for a sufficient period of time to achieve compliance prior to the effective date of such standards, and



(iv) the study and investigation of the National Academy of Sciences conducted pursuant to subsection (c) and other information available to him has not indicated that technology, processes, or other alternatives are available to meet such standards.

(D) Nothing in this paragraph shall extend the effective date of any emission standard required to be prescribed under this subsection for more than one year.

(c) (1) The Administrator shall undertake to enter into appropriate arrangements with the National Academy of Sciences to conduct a comprehensive study and investigation of the technological feasibility of meeting the emissions standards required to be prescribed by the Administrator by subsection (b) of this section.

(2) Of the funds authorized to be appropriated to the Administrator by this Act, such amounts as are required shall be available to carry out the study and investigation authorized by paragraph (1) of this subsection.

(3) In entering into any arrangement with the National Academy of Sciences for conducting the study and investigation authorized by paragraph (1) of this subsection, the Administrator shall request the National Academy of Sciences to submit semiannual reports on the progress of its study and investigation to the Administrator and the Congress, beginning not later than July 1, 1971, and continuing until such study and investigation is completed.

(4) The Administrator shall furnish to such Academy at its request any information which the Academy deems necessary for the purpose of conducting the investigation and study authorized by paragraph (1) of this subsection. For the purpose of furnishing such information, the Administrator may use any authority he has under this Act (A) to obtain information from any person, and (B) to require such person to conduct such tests, keep such records, and make such reports respecting research or other activities conducted by such person as may be reasonably necessary to carry out this subsection.

(d) The Administrator shall prescribe regulations under which the useful life of vehicles and engines shall be determined for purposes of subsection (a) (1) of this section and section 207. Such regulations shall provide that useful life shall—

(1) in the case of light duty vehicles and light duty vehicle engines, be a period of use of five years or of fifty thousand miles (or the equivalent), whichever first occurs; and

(2) in the case of any other motor vehicle or motor vehicle engine, be a period of use set forth in paragraph (1) unless the Administrator determines that a period of use of greater duration or mileage is appropriate.

(e) In the event a new power source or propulsion system for new motor vehicles or new motor vehicle engines



is submitted for certification pursuant to section 206 (a), the Administrator may postpone certification until he has prescribed standards for any air pollutants emitted by such vehicle or engine which cause or contribute to, or are likely to cause or contribute to, air pollution which endangers the public health or welfare but for which standards have not been prescribed under subsection (a).

#### PROHIBITED ACTS

SEC. 203. (a) The following acts and the causing thereof are prohibited—

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(1) in the case of a manufacturer of new motor vehicles or new motor vehicle engines for distribution in commerce, the sale, or the offering for sale, or the introduction, or delivery for introduction, into commerce, or (in the case of any person, except as provided by regulation of the Administrator), the importation into the United States, of any new motor vehicle or new motor vehicle engine, manufactured after the effective date of regulations under this part which are applicable to such vehicle or engine unless such vehicle or engine is covered by a certificate of conformity issued (and in effect) under regulations prescribed under this part (except as provided in subsection (b));

(2) for any person to fail or refuse to permit access to or copying of records or to fail to make reports or provide information, required under section 208;

(3) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser; or

(4) for any manufacturer of a new motor vehicle or new motor vehicle engine subject to standards prescribed under section 202—

(A) to sell or lease any such vehicle or engine unless such manufacturer has complied with the requirements of section 207 (a) and (b) with respect to such vehicle or engine, and unless a label or tag is affixed to such vehicle or engine in accordance with section 207 (c) (3), or

(B) to fail or refuse to comply with the requirements of section 207 (c) or (e).

(b) (1) The Administrator may exempt any new motor vehicle or new motor vehicle engine from subsection (a), upon such terms and conditions as he may find necessary for the purpose of research, investigations, studies, demonstrations, or training, or for reasons of national security.

(2) A new motor vehicle or new motor vehicle engine offered for importation or imported by any person in violation of subsection (a) shall be refused admission into the United States, but the Secretary of the Treasury and the Administrator may, by joint regulation, provide for deferring final determination as to admission and authorizing the delivery of such a motor vehicle or engine offered for import to the owner or consignee thereof upon such terms and conditions (including the furnishing of a bond) as may appear to them appropriate to insure that any such motor vehicle or engine will be brought into conformity with the standards, requirements, and limitations applicable to it under this part. The Secretary of the Treasury shall, if a motor vehicle or engine is finally refused admission under this paragraph, cause disposition thereof in accordance with the customs laws unless it is exported, under regulations prescribed by such Secretary, within ninety days of the date of notice of such refusal or such additional time as may be permitted pursuant to such regulations, except that disposition in accordance with the customs laws may not be made in such manner as may result, directly or indirectly, in the sale, to the ultimate consumer, of a new motor vehicle or new motor vehicle engine that fails to comply with applicable standards of the Administrator under this part.

(3) A new motor vehicle or new motor vehicle engine intended solely for export, and so labeled or tagged on the outside of the container and on the vehicle or engine itself, shall be subject to the provisions of subsection (a), except that if the country of export has emission standards which differ from the standards prescribed under subsection (a), then such vehicle or engine shall comply with the standards of such country of export.

(c) Upon application therefor, the Administrator may exempt from section 203(a) (3) any vehicles (or class thereof) manufactured before the 1974 model year from section 203(a) (3)<sup>1</sup> for the purpose of permitting modifications to the emission control device or system of such vehicle in order to use fuels other than those specified in certification testing under section 206(a) (1), if the Administrator, on the basis of information submitted by the applicant, finds that such modification will not result in such vehicle or engine not complying with standards under section 202 applicable to such vehicle or engine. Any such exemption shall identify (1) the vehicle or vehicles so exempted, (2) the specific nature of the modification, and (3) the person or class of persons to whom the exemption shall apply.

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#### INJUNCTION PROCEEDINGS

SEC. 204. (a) The district courts of the United States shall have jurisdiction to restrain violations of paragraph (1), (2), (3), or (4) of section 203(a).

<sup>1</sup> So in original.

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(b) Actions to restrain such violations shall be brought by and in the name of the United States. In any such action, subpoenas for witnesses who are required to attend a district court in any district may run into any other district.

## PENALTIES

SEC. 205. Any person who violates paragraph (1), (2), (3), or (4) of section 203(a) shall be subject to a civil penalty of not more than \$10,000. Any such violation with respect to paragraph (1), (2), or (4) of section 203(a) shall constitute a separate offense with respect to each motor vehicle or motor vehicle engine.

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MOTOR VEHICLE AND MOTOR VEHICLE ENGINE COMPLIANCE  
TESTING AND CERTIFICATION

SEC. 206. (a) (1) The Administrator shall test, or require to be tested in such manner as he deems appropriate, any new motor vehicle or new motor vehicle engine submitted by a manufacturer to determine whether such vehicle or engine conforms with the regulations prescribed under section 202 of this Act. If such vehicle or engine conforms to such regulations, the Administrator shall issue a certificate of conformity upon such terms, and for such period (not in excess of one year), as he may prescribe.

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(2) The Administrator shall test any emission control system incorporated in a motor vehicle or motor vehicle engine submitted to him by any person, in order to determine whether such system enables such vehicle or engine to conform to the standards required to be prescribed under section 202(b) of this Act. If the Administrator finds on the basis of such tests that such vehicle or engine conforms to such standards, the Administrator shall issue a verification of compliance with emission standards for such system when incorporated in vehicles of a class of which the tested vehicle is representative. He shall inform manufacturers and the National Academy of Sciences, and make available to the public, the results of such tests. Tests under this paragraph shall be conducted under such terms and conditions (including requirements for preliminary testing by qualified independent laboratories) as the Administrator may prescribe by regulations.

(b) (1) In order to determine whether new motor vehicles or new motor vehicle engines being manufactured by a manufacturer do in fact conform with the regulations with respect to which the certificate of conformity was issued, the Administrator is authorized to test such vehicles or engines. Such tests may be conducted by the Administrator directly or, in accordance with conditions specified by the Administrator, by the manufacturer.

(2) (A) (i) If, based on tests conducted under paragraph (1) on a sample of new vehicles or engines covered by a certificate of conformity, the Administrator



determines that all or part of the vehicles or engines so covered do not conform with the regulations with respect to which the certificate of conformity was issued, he may suspend or revoke such certificate in whole or in part, and shall so notify the manufacturer. Such suspension or revocation shall apply in the case of any new motor vehicles or new motor vehicle engines manufactured after the date of such notification (or manufactured before such date if still in the hands of the manufacturer), and shall apply until such time as the Administrator finds that vehicles and engines manufactured by the manufacturer do conform to such regulations. If, during any period of suspension or revocation, the Administrator finds that a vehicle or engine actually conforms to such regulations, he shall issue a certificate of conformity applicable to such vehicle or engine.

(ii) If, based on tests conducted under paragraph (1) on any new vehicle or engine, the Administrator determines that such vehicle or engine does not conform with such regulations, he may suspend or revoke such certificate insofar as it applies to such vehicle or engine until such time as he finds such vehicle or engine actually so conforms with such regulations, and he shall so notify the manufacturer.

(B) (i) At the request of any manufacturer the Administrator shall grant such manufacturer a hearing as to whether the tests have been properly conducted or any sampling methods have been properly applied, and make a determination on the record with respect to any suspension or revocation under subparagraph (A); but suspension or revocation under subparagraph (A) shall not be stayed by reason of such hearing.

(ii) In any case of actual controversy as to the validity of any determination under clause (i), the manufacturer may at any time prior to the 60th day after such determination is made file a petition with the United States court of appeals for the circuit wherein such manufacturer resides or has his principal place of business for a judicial review of such determination. A copy of the petition shall be forthwith transmitted by the clerk of the court to the Administrator or other officer designated by him for that purpose. The Administrator thereupon shall file in the court the record of the proceedings on which the Administrator based his determination, as provided in section 2112 of title 28 of the United States Code.

(iii) If the petitioner applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, in such manner and upon such



terms and conditions as the court may deem proper. The Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken and he shall file such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original determination, with the return of such additional evidence.

(iv) Upon the filing of the petition referred to in clause (ii), the court shall have jurisdiction to review the order in accordance with chapter 7 of title 5, United States Code, and to grant appropriate relief as provided in such chapter.

(c) For purposes of enforcement of this section, officers or employees duly designated by the Administrator, upon presenting appropriate credentials to the manufacturer or person in charge, are authorized (1) to enter, at reasonable times, any plant or other establishment of such manufacturers, for the purpose of conducting tests of vehicles or engines in the hands of the manufacturer, or (2) to inspect at reasonable times, records, files, papers, processes, controls, and facilities used by such manufacturer in conducting tests under regulations of the Administrator. Each such inspection shall be commenced and completed with reasonable promptness.

(d) The Administrator shall by regulation establish methods and procedures for making tests under this section.

(e) The Administrator shall announce in the Federal Register and make available to the public the results of his tests of any motor vehicle or motor vehicle engine submitted by a manufacturer under subsection (a) as promptly as possible after the enactment of the Clean Air Amendments of 1970 and at the beginning of each model year which begins thereafter. Such results shall be described in such nontechnical manner as will reasonably disclose to prospective ultimate purchasers of new motor vehicles and new motor vehicle engines the comparative performance of the vehicles and engines tested in meeting the standards prescribed under section 202 of this Act.

#### COMPLIANCE BY VEHICLES AND ENGINES IN ACTUAL USE

SEC. 207. (a) Effective with respect to vehicles and engines manufactured in model years beginning more than 60 days after the date of the enactment of the Clean Air Amendments of 1970, the manufacturer of each new motor vehicle and new motor vehicle engine shall warrant to the ultimate purchaser and each subsequent purchaser that such vehicle or engine is (1) designed, built, and equipped so as to conform at the time of sale with applicable regulations under section 202, and (2) free from defects in materials and workmanship which cause

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such vehicle or engine to fail to conform with applicable regulations for its useful life (as determined under sec. 202(d)).

(b) If the Administrator determines that (i) there are available testing methods and procedures to ascertain whether, when in actual use throughout its useful life (as determined under section 202(d)), each vehicle and engine to which regulations under section 202 apply complies with the emission standards of such regulations, (ii) such methods and procedures are in accordance with good engineering practices, and (iii) such methods and procedures are reasonably capable of being correlated with tests conducted under section 206(a)(1), then—

(1) he shall establish such methods and procedures by regulation, and

(2) at such time as he determines that inspection facilities or equipment are available for purposes of carrying out testing methods and procedures established under paragraph (1), he shall prescribe regulations which shall require manufacturers to warrant the emission control device or system of each new motor vehicle or new motor vehicle engine to which a regulation under section 202 applies and which is manufactured in a model year beginning after the Administrator first prescribes warranty regulations under this paragraph. The warranty under such regulations shall run to the ultimate purchaser and each subsequent purchaser and shall provide that if—

(A) the vehicle or engine is maintained and operated in accordance with instructions under subsection (c)(3),

(B) it fails to conform at any time during its useful life (as determined under section 202(d)) to the regulations prescribed under section 202, and

(C) such nonconformity results in the ultimate purchaser (or any subsequent purchaser) of such vehicle or engine having to bear any penalty or other sanction (including the denial of the right to use such vehicle or engine) under State or Federal law,

then such manufacturer shall remedy such nonconformity under such warranty with the cost thereof to be borne by the manufacturer.

(c) Effective with respect to vehicles and engines manufactured during model years beginning more than 60 days after the date of enactment of the Clean Air Amendments of 1970—

(1) If the Administrator determines that a substantial number of any class or category of vehicles or engines, although properly maintained and used, do not conform to the regulations prescribed under

section 202, when in actual use throughout their useful life (as determined under section 202(d)), he shall immediately notify the manufacturer thereof of such nonconformity, and he shall require the manufacturer to submit a plan for remedying the nonconformity of the vehicles or engines with respect to which such notification is given. The plan shall provide that the nonconformity of any such vehicles or engines which are properly used and maintained will be remedied at the expense of the manufacturer. If the manufacturer disagrees with such determination of nonconformity and so advises the Administrator, the Administrator shall afford the manufacturer and other interested persons an opportunity to present their views and evidence in support thereof at a public hearing. Unless, as a result of such hearing the Administrator withdraws such determination of nonconformity, he shall, within 60 days after the completion of such hearing, order the manufacturer to provide prompt notification of such nonconformity in accordance with paragraph (2).

(2) Any notification required by paragraph (1) with respect to any class or category of vehicles or engines shall be given to dealers, ultimate purchasers, and subsequent purchasers (if known) in such manner and containing such information as the Administrator may by regulations require.

(3) The manufacturer shall furnish with each new motor vehicle or motor vehicle engine such written instructions for the maintenance and use of the vehicle or engine by the ultimate purchaser as may be reasonable and necessary to assure the proper functioning of emission control devices and systems. In addition, the manufacturer shall indicate by means of a label or tag permanently affixed to such vehicle or engine that such vehicle or engine is covered by a certificate of conformity issued for the purpose of assuring achievement of emissions standards prescribed under section 202. Such label or tag shall contain such other information relating to control of motor vehicle emissions as the Administrator shall prescribe by regulation.

(d) Any cost obligation of any dealer incurred as a result of any requirement imposed by subsection (a), (b), or (c) shall be borne by the manufacturer. The transfer of any such cost obligation from a manufacturer to any dealer through franchise or other agreement is prohibited.

(e) If a manufacturer includes in any advertisement a statement respecting the cost or value of emission control devices or systems, such manufacturer shall set forth in such statement the cost or value attributed to such devices or systems by the Secretary of Labor (through the



Bureau of Labor Statistics). The Secretary of Labor, and his representatives, shall have the same access for this purpose to the books, documents, papers, and records of a manufacturer as the Comptroller General has to those of a recipient of assistance for purposes of section 311.

(f) Any inspection of a motor vehicle or a motor vehicle engine for purposes of subsection (c) (1), after its sale to the ultimate purchaser, shall be made only if the owner of such vehicle or engine voluntarily permits such inspection to be made, except as may be provided by any State or local inspection program.

#### RECORDS AND REPORTS

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SEC. 208. (a) Every manufacturer shall establish and maintain such records, make such reports, and provide such information as the Administrator may reasonably require to enable him to determine whether such manufacturer has acted or is acting in compliance with this part and regulations thereunder and shall, upon request of an officer or employee duly designated by the Administrator, permit such officer or employee at reasonable times to have access to and copy such records.

(b) Any records, reports or information obtained under subsection (a) shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that records, reports, or information, or particular part thereof (other than emission data), to which the Administrator has access under this section if made public, would divulge methods or processes entitled to protection as trade secrets of such person, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such record, report, or information may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act or when relevant in any proceeding under this Act. Nothing in this section shall authorize the withholding of information by the Administrator or any officer or employee under his control from the duly authorized committees of the Congress.

#### STATE STANDARDS

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SEC. 209. (a) No State or any political subdivision thereof shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part. No State shall require certification, inspection, or any other approval relating to the control of emissions from any new motor vehicle or new motor vehicle engine as condition precedent to the initial retail sale, titling (if



any), or registration of such motor vehicle, motor vehicle engine, or equipment.

(b) The Administrator shall, after notice and opportunity for public hearing, waive application of this section to any State which has adopted standards (other than crankcase emission standards) for the control of emissions from new motor vehicles or new motor vehicle engines prior to March 30, 1966, unless he finds that such State does not require standards more stringent than applicable Federal standards to meet compelling and extraordinary conditions or that such State standards and accompanying enforcement procedures are not consistent with section 202(a) of this part.

(c) Nothing in this part shall preclude or deny to any State or political subdivision thereof the right otherwise to control, regulate, or restrict the use, operation, or movement of registered or licensed motor vehicles.

#### STATE GRANTS

SEC. 210. The Administrator is authorized to make grants to appropriate State agencies in an amount up to two-thirds of the cost of developing and maintaining effective vehicle emission devices and systems inspection and emission testing and control programs, except that—

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(1) no such grant shall be made for any part of any State vehicle inspection program which does not directly relate to the cost of the air pollution control aspects of such a program;

(2) no such grant shall be made unless the Secretary of Transportation has certified to the Administrator that such program is consistent with any highway safety program developed pursuant to section 402 of title 23 of the United States Code; and

(3) no such grant shall be made unless the program includes provisions designed to insure that emission control devices and systems on vehicles in actual use have not been discontinued or rendered inoperative.

#### REGULATION OF FUELS

SEC. 211. (a) The Administrator may by regulation designate any fuel or fuel additive and, after such date or dates as may be prescribed by him, no manufacturer or processor of any such fuel or additive may sell, offer for sale, or introduce into commerce such fuel or additive unless the Administrator has registered such fuel or additive in accordance with subsection (b) of this section.

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(b)(1) For the purpose of registration of fuels and fuel additives, the Administrator shall require—

(A) the manufacturer of any fuel to notify him as to the commercial identifying name and manu-

facturer of any additive contained in such fuel; the range of concentration of any additive in the fuel; and the purpose-in-use of any such additive; and

(B) the manufacturer of any additive to notify him as to the chemical composition of such additive.

(2) For the purpose of registration of fuels and fuel additives, the Administrator may also require the manufacturer of any fuel or fuel additive—

(A) to conduct tests to determine potential public health effects of such fuel or additive (including, but not limited to, carcinogenic, teratogenic, or mutagenic effects), and

(B) to furnish the description of any analytical technique that can be used to detect and measure any additive in such fuel, the recommended range of concentration of such additive, and the recommended purpose-in-use of such additive, and such other information as is reasonable and necessary to determine the emissions resulting from the use of the fuel or additive contained in such fuel, the effect of such fuel or additive on the emission control performance of any vehicle or vehicle engine, or the extent to which such emissions affect the public health or welfare.

Tests under subparagraph (A) shall be conducted in conformity with test procedures and protocols established by the Administrator. The results of such tests shall not be considered confidential.

(3) Upon compliance with the provisions of this subsection, including assurances that the Administrator will receive changes in the information required, the Administrator shall register such fuel or fuel additive.

(c) (1) The Administrator may, from time to time on the basis of information obtained under subsection (b) of this section or other information available to him, by regulation, control or prohibit the manufacture, introduction into commerce, offering for sale, or sale of any fuel or fuel additive for use in a motor vehicle or motor vehicle engine (A) if any emission products of such fuel or fuel additive will endanger the public health or welfare, or (B) if emission products of such fuel or fuel additive will impair to a significant degree the performance of any emission control device or system which is in general use, or which the Administrator finds has been developed to a point where in a reasonable time it would be in general use were such regulation to be promulgated.

(2) (A) No fuel, class of fuels, or fuel additive may be controlled or prohibited by the Administrator pursuant to clause (A) of paragraph (1) except after consideration of all relevant medical and scientific evidence available to him, including consideration of other tech-

nologically or economically feasible means of achieving emission standards under section 202.

(B) No fuel or fuel additive may be controlled or prohibited by the Administrator pursuant to clause (B) of paragraph (1) except after consideration of available scientific and economic data, including a cost benefit analysis comparing emission control devices or systems which are or will be in general use and require the proposed control or prohibition with emission control devices or systems which are or will be in general use and do not require the proposed control or prohibition. On request of a manufacturer of motor vehicles, motor vehicle engines, fuels, or fuel additives submitted within 10 days of notice of proposed rulemaking, the Administrator shall hold a public hearing and publish findings with respect to any matter he is required to consider under this subparagraph. Such findings shall be published at the time of promulgation of final regulations.

(C) No fuel or fuel additive may be prohibited by the Administrator under paragraph (1) unless he finds, and publishes such finding, that in his judgment such prohibition will not cause the use of any other fuel or fuel additive which will produce emissions which will endanger the public health or welfare to the same or greater degree than the use of the fuel or fuel additive proposed to be prohibited.

(3) (A) For the purpose of obtaining evidence and data to carry out paragraph (2), the Administrator may require the manufacturer of any motor vehicle or motor vehicle engine to furnish any information which has been developed concerning the emissions from motor vehicles resulting from the use of any fuel or fuel additive, or the effect of such use on the performance of any emission control device or system.

(B) In obtaining information under subparagraph (A), section 307 (a) (relating to subpoenas) shall be applicable.

(4) (A) Except as otherwise provided in subparagraph (B) or (C), no State (or political subdivision thereof) may prescribe or attempt to enforce, for the purposes of motor vehicle emission control, any control or prohibition respecting use of a fuel or fuel additive in a motor vehicle or motor vehicle engine—

(i) if the Administrator has found that no control or prohibition under paragraph (1) is necessary and has published his finding in the Federal Register, or

(ii) if the Administrator has prescribed under paragraph (1) a control or prohibition applicable to such fuel or fuel additive, unless State prohibition or control is identical to the prohibition or control prescribed by the Administrator.

(B) Any State for which application of section 209 (a) has at any time been waived under section 209 (b)



may at any time prescribe and enforce, for the purpose of motor vehicle emission control, a control or prohibition respecting any fuel or fuel additive.

(C) A State may prescribe and enforce, for purposes of motor vehicle emission control, a control or prohibition respecting the use of a fuel or fuel additive in a motor vehicle or motor vehicle engine if an applicable implementation plan for such State under section 110 so provides. The Administrator may approve such provision in an implementation plan, or promulgate an implementation plan containing such a provision, only if he finds that the State control or prohibition is necessary to achieve the national primary or secondary ambient air quality standard which the plan implements.

(d) Any person who violates subsection (a) or the regulations prescribed under subsection (c) or who fails to furnish any information required by the Administrator under subsection (b) shall forfeit and pay to the United States a civil penalty of \$10,000 for each and every day of the continuance of such violation, which shall accrue to the United States and be recovered in a civil suit in the name of the United States, brought in the district where such person has his principal office or in any district in which he does business. The Administrator may, upon application therefor, remit or mitigate any forfeiture provided for in this subsection and he shall have authority to determine the facts upon all such applications.

#### DEVELOPMENT OF LOW-EMISSION VEHICLES

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SEC. 212 (a) For the purpose of this section—

(1) The term "Board" means the Low-Emission Vehicle Certification Board.

(2) The term "Federal Government" includes the legislative, executive, and judicial branches of the Government of the United States, and the government of the District of Columbia.

(3) The term "motor vehicle" means any self-propelled vehicle designed for use in the United States on the highways, other than a vehicle designed or used for military field training, combat, or tactical purposes.

(4) The term "low-emission vehicle" means any motor vehicle which—

(A) emits any air pollutant in amounts significantly below new motor vehicle standards applicable under section 202 at the time of procurement to that type of vehicle; and

(B) with respect to all other air pollutants meets the new motor vehicle standards applicable under section 202 at the time of procurement to that type of vehicle.



(5) The term "retail price" means (A) the maximum statutory price applicable to any class or model of motor vehicle; or (B) in any case where there is no applicable maximum statutory price, the most recent procurement price paid for any class or model of motor vehicle.

(b)(1) There is established a Low-Emission Vehicle Certification Board to be composed of the Administrator or his designee, the Secretary of Transportation or his designee, the Chairman of the Council on Environmental Quality or his designee, the Director of the National Highway Safety Bureau in the Department of Transportation, the Administrator of General Services, and two members appointed by the President. The President shall designate one member of the Board as Chairman.

(2) Any member of the Board not employed by the United States may receive compensation at the rate of \$125 for each day such member is engaged upon work of the Board. Each member of the Board shall be reimbursed for travel expenses, including per diem in lieu of subsistence as authorized by section 5703 of title 5, United States Code, for persons in the Government service employed intermittently.

(3)(A) The Chairman, with the concurrence of the members of the Board, may employ and fix the compensation of such additional personnel as may be necessary to carry out the functions of the Board, but no individual so appointed shall receive compensation in excess of the rate authorized for GS-18 by section 5332 of title 5, United States Code.

(B) The Chairman may fix the time and place of such meetings as may be required, but a meeting of the Board shall be called whenever a majority of its members so request.

(C) The Board is granted all other powers necessary for meeting its responsibilities under this section.

(c) The Administrator shall determine which models or classes of motor vehicles qualify as low-emission vehicles in accordance with the provisions of this section.

(d)(1) The Board shall certify any class or model of motor vehicles—

(A) for which a certification application has been filed in accordance with paragraph (3) of this subsection;

(B) which is a low-emission vehicle as determined by the Administrator; and

(C) which it determines is suitable for use as a substitute for a class or model of vehicles at that time in use by agencies of the Federal Government.

The Board shall specify with particularity the class or model of vehicles for which the class or model of vehicles described in the application is a suitable substitute. In

making the determination under this subsection the Board shall consider the following criteria:

- (i) the safety of the vehicle;
- (ii) its performance characteristics;
- (iii) its reliability potential;
- (iv) its serviceability;
- (v) its fuel availability;
- (vi) its noise level; and
- (vii) its maintenance costs as compared with the class or model of motor vehicle for which it may be a suitable substitute.

(2) Certification under this section shall be effective for a period of one year from the date of issuance.

(3) (A) Any party seeking to have a class or model of vehicle certified under this section shall file a certification application in accordance with regulations prescribed by the Board.

(B) The Board shall publish a notice of each application received in the Federal Register.

(C) The Administrator and the Board shall make determinations for the purpose of this section in accordance with procedures prescribed by regulation by the Administrator and the Board, respectively.

(D) The Administrator and the Board shall conduct whatever investigation is necessary, including actual inspection of the vehicle at a place designated in regulations prescribed under subparagraph (A).

(E) The Board shall receive and evaluate written comments and documents from interested parties in support of, or in opposition to, certification of the class or model of vehicle under consideration.

(F) Within ninety days after the receipt of a properly filed certification application, the Administrator shall determine whether such class or model of vehicle is a low-emission vehicle, and within 180 days of such determination, the Board shall reach a decision by majority vote as to whether such class or model of vehicle, having been determined to be a low-emission vehicle, is a suitable substitute for any class or classes of vehicles presently being purchased by the Federal Government for use by its agencies.

(G) Immediately upon making any determination or decision under subparagraph (F), the Administrator and the Board shall each publish in the Federal Register notice of such determination or decision, including reasons therefor and in the case of the Board any dissenting views.

(e) (1) Certified low-emission vehicles shall be acquired by purchase or lease by the Federal Government for use by the Federal Government in lieu of other vehicles if the Administrator of General Services determines that such certified vehicles have procurement costs which are

no more than 150 per centum of the retail price of the least expensive class or model of motor vehicle for which they are certified substitutes.

(2) In order to encourage development of inherently low-polluting propulsion technology, the Board may, at its discretion, raise the premium set forth in paragraph (1) of this subsection to 200 per centum of the retail price of any class or model of motor vehicle for which a certified low-emission vehicle is a certified substitute, if the Board determines that the certified low-emission vehicle is powered by an inherently low-polluting propulsion system.

(3) Data relied upon by the Board and the Administrator in determining that a vehicle is a certified low-emission vehicle shall be incorporated in any contract for the procurement of such vehicle.

(f) The procuring agency shall be required to purchase available certified low-emission vehicles which are eligible for purchase to the extent they are available before purchasing any other vehicles for which any low-emission vehicle is a certified substitute. In making purchasing selections between competing eligible certified low-emission vehicles, the procuring agency shall give priority to (1) any class or model which does not require extensive periodic maintenance to retain its low-polluting qualities or which does not require the use of fuels which are more expensive than those of the classes or models of vehicles for which it is a certified substitute; and (2) passenger vehicles other than buses.

(g) For the purpose of procuring certified low-emission vehicles any statutory price limitations shall be waived.

(h) The Administrator shall, from time to time as the Board deems appropriate, test the emissions from certified low-emission vehicles purchased by the Federal Government. If at any time he finds that the emission rates exceed the rates on which certification under this section was based, the Administrator shall notify the Board. Thereupon the Board shall give the supplier of such vehicles written notice of this finding, issue public notice of it, and give the supplier an opportunity to make necessary repairs, adjustments, or replacements. If no such repairs, adjustments, or replacements are made within a period to be set by the Board, the Board may order the supplier to show cause why the vehicle involved should be eligible for recertification.

(i) There are authorized to be appropriated for paying additional amounts for motor vehicles pursuant to, and for carrying out the provisions of, this section, \$5,000,000 for the fiscal year ending June 30, 1971, and \$25,000,000 for each of the two succeeding fiscal years.

(j) The Board shall promulgate the procedures required to implement this section within one hundred and



eighty days after the date of enactment of the Clean Air Amendments of 1970.

FUEL ECONOMY IMPROVEMENT FROM NEW MOTOR VEHICLES

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SEC. 213. (a) (1) The Administrator and the Secretary of Transportation shall conduct a joint study, and shall report to the Committee on Interstate and Foreign Commerce of the United States House of Representatives and the Committees on Public Works and Commerce of the United States Senate within one hundred and twenty days following the date of enactment of this section, concerning the practicability of establishing a fuel economy improvement standard of 20 per centum for new motor vehicles manufactured during and after model year 1980. Such study and report shall include, but not be limited to, the technological problems of meeting any such standard, including the leadtime involved; the test procedures required to determine compliance; the economic costs associated with such standard, including any beneficial economic impact; the various means of enforcing such standard; the effect on consumption of natural resources, including energy consumed; and the impact of applicable safety and emission standards. In the course of performing such study, the Administrator and the Secretary of Transportation shall utilize the research previously performed in the Department of Transportation, and the Administrator and the Secretary shall consult with the Federal Energy Administrator, the Chairman of the Council on Environmental Quality, and the Secretary of the Treasury. The Office of Management and Budget may review such report before its submission to such committees of the Congress, but such Office may not revise the report or delay its submission beyond the date prescribed for its submission, and may submit to Congress its comments respecting such report. In connection with such study, the Administrator may utilize the authority provided in section 307 (a) of this Act to obtain necessary information.

(2) For the purpose of this section, the term "fuel economy improvement standard" means a requirement of a percentage increase in the number of miles of transportation provided by a manufacturer's entire annual production of new motor vehicles per unit of fuel consumed, as determined for each manufacturer in accordance with test procedures established by the Administrator pursuant to this Act. Such term shall not include any requirement for any design standard or any other requirement specifying or otherwise limiting the manufacturer's discretion in deciding how to comply with the fuel economy improvement standard by any lawful means.



## DEFINITIONS FOR PART A

SEC. 214. As used in this part—

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(1) The term "manufacturer" as used in sections 202, 203, 206, 207, and 208 means any person engaged in the manufacturing or assembling of new motor vehicles or new motor vehicle engines, or importing such vehicles or engines for resale, or who acts for and is under the control of any such person in connection with the distribution of new motor vehicles or new motor vehicle engines, but shall not include any dealer with respect to new motor vehicles or new motor vehicle engines received by him in commerce.

(2) The term "motor vehicle" means any self-propelled vehicle designed for transporting persons or property on a street or highway.

(3) Except with respect to vehicles or engines imported or offered for importation, the term "new motor vehicle" means a motor vehicle the equitable or legal title to which has never been transferred to an ultimate purchaser; and the term "new motor vehicle engine" means an engine in a new motor vehicle or a motor vehicle engine the equitable or legal title to which has never been transferred to the ultimate purchaser; and with respect to imported vehicles or engines, such terms mean a motor vehicle and engine, respectively, manufactured after the effective date of a regulation issued under section 202 which is applicable to such vehicle or engine (or which would be applicable to such vehicle or engine had it been manufactured for importation into the United States).

(4) The term "dealer" means any person who is engaged in the sale or the distribution of new motor vehicles or new motor vehicle engines to the ultimate purchaser.

(5) The term "ultimate purchaser" means, with respect to any new motor vehicle or new motor vehicle engine, the first person who in good faith purchases such new motor vehicle or new engine for purposes other than resale.

(6) The term "commerce" means (A) commerce between any place in any State and any place outside thereof; and (B) commerce wholly within the District of Columbia.

## PART B—AIRCRAFT EMISSION STANDARDS

## ESTABLISHMENT OF STANDARDS

SEC. 231. (a) (1) Within 90 days after the date of enactment of the Clean Air Amendments of 1970, the Administrator shall commence a study and investigation of

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emissions of air pollutants from aircraft in order to determine—

(A) the extent to which such emissions affect air quality in air quality control regions throughout the United States, and

(B) the technological feasibility of controlling such emissions.

(2) Within 180 days after commencing such study and investigation, the Administrator shall publish a report of such study and investigation and shall issue proposed emission standards applicable to emissions of any air pollutant from any class or classes of aircraft or aircraft engines which in his judgment cause or contribute to or are likely to cause or contribute to air pollution which endangers the public health or welfare.

(3) The Administrator shall hold public hearings with respect to such proposed standards. Such hearings shall, to the extent practicable, be held in air quality control regions which are most seriously affected by aircraft emissions. Within 90 days after the issuance of such proposed regulations, he shall issue such regulation with such modifications as he deems appropriate. Such regulations may be revised from time to time.

(b) Any regulation prescribed under this section (and any revision thereof) shall take effect after such period as the Administrator finds necessary (after consultation with the Secretary of Transportation) to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.

(c) Any regulations under this section, or amendments thereto, with respect to aircraft, shall be prescribed only after consultation with the Secretary of Transportation in order to assure appropriate consideration for aircraft safety.

#### ENFORCEMENT OF STANDARDS

49 U.S.C.  
1857f-10

SEC. 232. (a) The Secretary of Transportation, after consultation with the Administrator, shall prescribe regulations to insure compliance with all standards prescribed under section 231 by the Administrator. The regulations of the Secretary of Transportation shall include provisions making such standards applicable in the issuance, amendment, modification, suspension, or revocation of any certificate authorized by the Federal Aviation Act or the Department of Transportation Act. Such Secretary shall insure that all necessary inspections are accomplished, and, may execute any power or duty vested in him by any other provision of law in the execution of all powers and duties vested in him under this section.

(b) In any action to amend, modify, suspend, or revoke a certificate in which violation of an emission standard prescribed under section 231 or of a regulation prescribed under subsection (a) is at issue, the certificate holder shall have the same notice and appeal rights as are prescribed for such holders in the Federal Aviation Act of 1958 or the Department of Transportation Act, except that in any appeal to the National Transportation Safety Board, the Board may amend, modify, or revoke the order of the Secretary of Transportation only if it finds no violation of such standard or regulation and that such amendment, modification, or revocation is consistent with safety in air transportation.

#### STATE STANDARDS AND CONTROLS

SEC. 233. No State or political subdivision thereof may adopt or attempt to enforce any standard respecting emissions of any air pollutant from any aircraft or engine thereof unless such standard is identical to a standard applicable to such aircraft under this part.

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#### DEFINITIONS

SEC. 234. Terms used in this part (other than Administrator) shall have the same meaning as such terms have under section 101 of the Federal Aviation Act of 1958.

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1857f-12



## TITLE III—GENERAL

## ADMINISTRATION

43 U.S.C. 1857g

SEC. 301. (a) The Administrator is authorized to prescribe such regulations as are necessary to carry out his functions under this Act. The Administrator may delegate to any officer or employee of the Environmental Protection Agency such of his powers and duties under this Act, except the making of regulations, as he may deem necessary or expedient.

(b) Upon the request of an air pollution control agency, personnel of the Environmental Protection Agency may be detailed to such agency for the purpose of carrying out the provisions of this Act.

(c) Payments under grants made under this Act may be made in installments, and in advance or by way of reimbursement, as may be determined by the Administrator.

## DEFINITIONS

43 U.S.C. 1857h

SEC. 302. When used in this Act—

(a) The term "Administrator" means the Administrator of the Environmental Protection Agency.

(b) The term "air pollution control agency" means any of the following:

(1) A single State agency designated by the Governor of that State as the official State air pollution control agency for purposes of this Act;

(2) An agency established by two or more States and having substantial powers or duties pertaining to the prevention and control of air pollution;

(3) A city, county, or other local government health authority, or, in the case of any city, county, or other local government in which there is an agency other than the health authority charged with responsibility for enforcing ordinances or laws relating to the prevention and control of air pollution, such other agency; or

(4) An agency of two or more municipalities located in the same State or in different States and having substantial powers or duties pertaining to the prevention and control of air pollution.

(c) The term "interstate air pollution control agency" means—

(1) an air pollution control agency established by two or more States, or



(2) an air pollution control agency of two or more municipalities located in different States.

(d) The term "State" means a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, and American Samoa.

(e) The term "person" includes an individual, corporation, partnership, association, State, municipality, and political subdivision of a State.

(f) The term "municipality" means a city, town, borough, county, parish, district, or other public body created by or pursuant to State law.

(g) The term "air pollutant" means an air pollution agent or combination of such agents.

(h) All language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being.

#### EMERGENCY POWERS

SEC. 303. Notwithstanding any other provisions of this Act, the Administrator upon receipt of evidence that a pollution source or combination of sources (including moving sources) is presenting an imminent and substantial endangerment to the health of persons, and that appropriate State or local authorities have not acted to abate such sources, may bring suit on behalf of the United States in the appropriate United States district court to immediately restrain any person causing or contributing to the alleged pollution to stop the emission of air pollutants causing or contributing to such pollution or to take such other action as may be necessary.

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#### CITIZEN SUITS

SEC. 304. (a) Except as provided in subsection (b), any person may commence a civil action on his own behalf—

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1857h-2

(1) against any person (including (i) the United States, and (ii) any other governmental instrumentality or agency to the extent permitted by the Eleventh Amendment to the Constitution) who is alleged to be in violation of (A) an emission standard or limitation under this Act or (B) an order issued by the Administrator or a State with respect to such a standard or limitation, or

(2) against the Administrator where there is alleged a failure of the Administrator to perform any act or duty under this Act which is not discretionary with the Administrator.

The district courts shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce such an emission standard or limitation, or such an order, or to order the Administrator to perform such act or duty, as the case may be.

(b) No action may be commenced—

(1) under subsection (a) (1)—

(A) prior to 60 days after the plaintiff has given notice of the violation (i) to the Administrator, (ii) to the State in which the violation occurs, and (iii) to any alleged violator of the standard, limitation, or order, or

(B) if the Administrator or State has commenced and is diligently prosecuting a civil action in a court of the United States or a State to require compliance with the standard, limitation, or order, but in any such action in a court of the United States any person may intervene as a matter of right.

(2) under subsection (a) (2) prior to 60 days after the plaintiff has given notice of such action to the Administrator,

except that such action may be brought immediately after such notification in the case of an action under this section respecting a violation of section 112(c) (1) (B) or an order issued by the Administrator pursuant to section 113(a). Notice under this subsection shall be given in such manner as the Administrator shall prescribe by regulation.

(c) (1) Any action respecting a violation by a stationary source of an emission standard or limitation or an order respecting such standard or limitation may be brought only in the judicial district in which such source is located.

(2) In such action under this section, the Administrator, if not a party, may intervene as a matter of right.

(d) The court, in issuing any final order in any action brought pursuant to subsection (a) of this section, may award costs of litigation (including reasonable attorney and expert witness fees) to any party, whenever the court determines such award is appropriate. The court may, if a temporary restraining order or preliminary injunction is sought, require the filing of a bond or equivalent security in accordance with the Federal Rules of Civil Procedure.

(e) Nothing in this section shall restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any emission standard or limitation or to seek any other relief (including relief against the Administrator or a State agency).

(f) For purposes of this section, the term "emission standard or limitation under this Act" means—

(1) a schedule or timetable of compliance, emission limitation, standard of performance or emission standard, or

(2) a control or prohibition respecting a motor vehicle fuel or fuel additive,

which is in effect under this Act (including a requirement applicable by reason of section 118) or under an applicable implementation plan.

#### APPEARANCE

SEC. 305. The Administrator shall request the Attorney General to appear and represent him in any civil action instituted under this Act to which the Administrator is a party. Unless the Attorney General notifies the Administrator that he will appear in such action, within a reasonable time, attorneys appointed by the Administrator shall appear and represent him.

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#### FEDERAL PROCUREMENT

SEC. 306. (a) No Federal agency may enter into any contract with any person who is convicted of any offense under section 113(c) (1) for the procurement of goods, materials, and services to perform such contract at any facility at which the violation which gave rise to such conviction occurred if such facility is owned, leased, or supervised by such person. The prohibition in the preceding sentence shall continue until the Administrator certifies that the condition giving rise to such a conviction has been corrected.

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(b) The Administrator shall establish procedures to provide all Federal agencies with the notification necessary for the purposes of subsection (a).

(c) In order to implement the purposes and policy of this Act to protect and enhance the quality of the Nation's air, the President shall, not more than 180 days after enactment of the Clean Air Amendments of 1970 cause to be issued an order (1) requiring each Federal agency authorized to enter into contracts and each Federal agency which is empowered to extend Federal assistance by way of grant, loan, or contract to effectuate the purpose and policy of this Act in such contracting or assistance activities, and (2) setting forth procedures, sanctions, penalties, and such other provisions, as the President determines necessary to carry out such requirement.

(d) The President may exempt any contract, loan, or grant from all or part of the provisions of this section where he determines such exemption is necessary in the paramount interest of the United States and he shall notify the Congress of such exemption.



(c) The President shall annually report to the Congress on measures taken toward implementing the purpose and intent of this section, including but not limited to the progress and problems associated with implementation of this section.

GENERAL PROVISION RELATING TO ADMINISTRATIVE  
PROCEEDINGS AND JUDICIAL REVIEW

42 U.S.C.  
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SEC. 307. (a) (1) In connection with any determination under section 110(f) or section 202(b) (5), or for purposes of obtaining information under section 202(b) (4) or 211(c) (3), the Administrator may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. Except for emission data, upon a showing satisfactory to the Administrator by such owner or operator that such papers, books, documents, or information or particular part thereof, if made public, would divulge trade secrets or secret processes of such owner or operator, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such paper, book, document, or information may be discussed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act, to persons carrying out the National Academy of Sciences' study and investigation provided for in section 202(c), or when relevant in any proceeding under this Act. Witnesses summoned shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. In cases of contumacy or refusal to obey a subpoena served upon any person under this subparagraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator to appear and produce papers, books, and documents before the Administrator, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(b) (1) A petition for review of action of the Administrator in promulgating any national primary or secondary ambient air quality standard, any emission standard under section 112, any standard of performance under section 111, any standard under section 202 (other than a standard required to be prescribed under section 202(b) (1)), any determination under section 202(b) (5), any control or prohibition under section 211, or any standard under section 231 may be filed only in the United States Court of Appeals for the District of Columbia. A petition



for review of the Administrator's action in approving or promulgating any implementation plan under section 110 or section 111(d), or his action under section 119(c) (2) (A), (B), or (C) or under regulations thereunder, may be filed only in the United States Court of Appeals for the appropriate circuit. Any such petition shall be filed within 30 days from the date of such promulgation, approval, or action, or after such date if such petition is based solely on grounds arising after such 30th day.

(2) Action of the Administrator with respect to which review could have been obtained under paragraph (1) shall not be subject to judicial review in civil or criminal proceedings for enforcement.

(c) In any judicial proceeding in which review is sought of a determination under this Act required to be made on the record after notice and opportunity for hearing, if any party applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, in such manner and upon such terms and conditions as to the court may deem proper. The Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken and he shall file such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original determination, with the return of such additional evidence.

#### MANDATORY LICENSING

SEC. 308. Whenever the Attorney General determines upon application of the Administrator—

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(1) that—

(A) in the implementation of the requirements of section 111, 112, or 202 of this Act, a right under any United States letters patent, which is being used or intended for public or commercial use and not otherwise reasonably available, is necessary to enable any person required to comply with such limitation to so comply, and

(B) there are no reasonable alternative methods to accomplish such purpose, and

(2) that the unavailability of such right may result in a substantial lessening of competition or tendency to create a monopoly in any line of commerce in any section of the country,

the Attorney General may so certify to a district court of the United States, which may issue an order requiring the person who owns such patent to license it on such

reasonable terms and conditions as the court, after hearing, may determine. Such certification may be made to the district court for the district in which the person owning the patent resides, does business, or is found.

#### POLICY REVIEW

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SEC. 309. (a) The Administrator shall review and comment in writing on the environmental impact of any matter relating to duties and responsibilities granted pursuant to this Act or other provisions of the authority of the Administrator, contained in any (1) legislation proposed by any Federal department or agency, (2) newly authorized Federal projects for construction and any major Federal agency action other than a project for construction to which section 102(2)(C) of Public Law 91-190 applies, and (3) proposed regulations published by any department or agency of the Federal Government. Such written comment shall be made public at the conclusion of any such review.

(b) In the event the Administrator determines that any such legislation, action, or regulation is unsatisfactory from the standpoint of public health or welfare or environmental quality, he shall publish his determination and the matter shall be referred to the Council on Environmental Quality.

#### OTHER AUTHORITY NOT AFFECTED

42 U.S.C. 1887f

SEC. 310. (a) Except as provided in subsection (b) of this section, this Act shall not be construed as superseding or limiting the authorities and responsibilities, under any other provision of law, of the Administrator or any other Federal officer, department, or agency.

(b) No appropriation shall be authorized or made under section 301, 311, or 314 of the Public Health Service Act for any fiscal year after the fiscal year ending June 30, 1964, for any purpose for which appropriations may be made under authority of this Act.

#### RECORDS AND AUDIT

42 U.S.C. 1887j

SEC. 311. (a) Each recipient of assistance under this Act shall keep such records as the Administrator shall prescribe, including records which fully disclose the amount and disposition by such recipient of the proceeds of such assistance, the total cost of the project or undertaking in connection with which such assistance is given or used, and the amount of that portion of the cost of the project or undertaking supplied by other sources, and such other records as will facilitate an effective audit.

(b) The Administrator and the Comptroller General of the United States, or any of their duly authorized representatives, shall have access for the purpose of audit

and examinations to any books, documents, papers, and records of the recipients that are pertinent to the grants received under this Act.

#### COMPREHENSIVE ECONOMIC COST STUDIES

SEC. 312. (a) In order to provide the basis for evaluating programs authorized by this act and the development of new programs and to furnish the Congress with the information necessary for authorization of appropriations by fiscal years beginning after June 30, 1969, the Administrator, in cooperation with State, interstate, and local air pollution control agencies, shall make a detailed estimate of the cost of carrying out the provisions of this Act; a comprehensive study of the cost of program implementation by affected units of government; and a comprehensive study of the economic impact of air quality standards on the Nation's industries, communities, and other contributing sources of pollution, including an analysis of the national requirements for and the cost of controlling emissions to attain such standards of air quality as may be established pursuant to this Act or applicable State law. The Administrator shall submit such detailed estimate and the results of such comprehensive study of cost for the five-year period beginning July 1, 1969, and the results of such other studies, to the Congress not later than January 10, 1969, and shall submit a reevaluation of such estimate and studies annually thereafter.

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(b) The Administrator shall also make a complete investigation and study to determine (1) the need for additional trained State and local personnel to carry out programs assisted pursuant to this Act and other programs for the same purpose as this Act; (2) means of using existing Federal training programs to train such personnel; and (3) the need for additional trained personnel to develop, operate and maintain those pollution control facilities designed and installed to implement air quality standards. He shall report the results of such investigation and study to the President and the Congress not later than July 1, 1969.

#### ADDITIONAL REPORTS TO CONGRESS

SEC. 313. Not later than six months after the effective date of this section and not later than January 10 of each calendar year beginning after such date, the Administrator shall report to the Congress on measures taken toward implementing the purpose and intent of this Act including, but not limited to, (1) the progress and problems associated with control of automotive exhaust emissions and the research efforts related thereto; (2) the development of air quality criteria and recommended

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emission control requirements; (3) the status of enforcement actions taken pursuant to this Act; (4) the status of State ambient air standards setting, including such plans for implementation and enforcement as have been developed; (5) the extent of development and expansion of air pollution monitoring systems; (6) progress and problems related to development of new and improved control techniques; (7) the development of quantitative and qualitative instrumentation to monitor emissions and air quality; (8) standards set or under consideration pursuant to title II of this Act; (9) the status of State, interstate, and local pollution control programs established pursuant to and assisted by this Act; and (10) the reports and recommendations made by the President's Air Quality Advisory Board.

#### LABOR STANDARDS

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1857j-3

SEC. 314. The Administrator shall take such action as may be necessary to insure that all laborers and mechanics employed by contractors or subcontractors on projects assisted under this Act shall be paid wages at rates not less than those prevailing for the same type of work on similar construction in the locality as determined by the Secretary of Labor, in accordance with the Act of March 3, 1931, as amended, known as the Davis-Bacon Act (46 Stat. 1494; 40 U.S.C. 276a-276a-5). The Secretary of Labor shall have, with respect to the labor standards specified in this subsection, the authority and functions set forth in Reorganization Plan Numbered 14 of 1950 (15 F.R. 3176; 64 Stat. 1267) and section 2 of the Act of June 13, 1934, as amended (48 Stat. 948; 40 U.S.C. 276c).

#### SEPARABILITY

42 U.S.C. 1857k

SEC. 315. If any provision of this Act, or the application of any provision of this Act to any person or circumstance, is held invalid, the application of such provision to other persons or circumstances, and the remainder of this Act, shall not be affected thereby.

#### APPROPRIATIONS

42 U.S.C. 1857l

SEC. 316. There are authorized to be appropriated to carry out this Act, other than sections 103(f)(3) and (d), 104, 212, and 403, \$125,000,000 for the fiscal year ending June 30, 1971, \$225,000,000 for the fiscal year ending June 30, 1972, \$300,000,000 for the fiscal year ending June 30, 1973, \$300,000,000 for fiscal year ending June 30, 1974, and \$300,000,000 for the fiscal year ending June 30, 1975.



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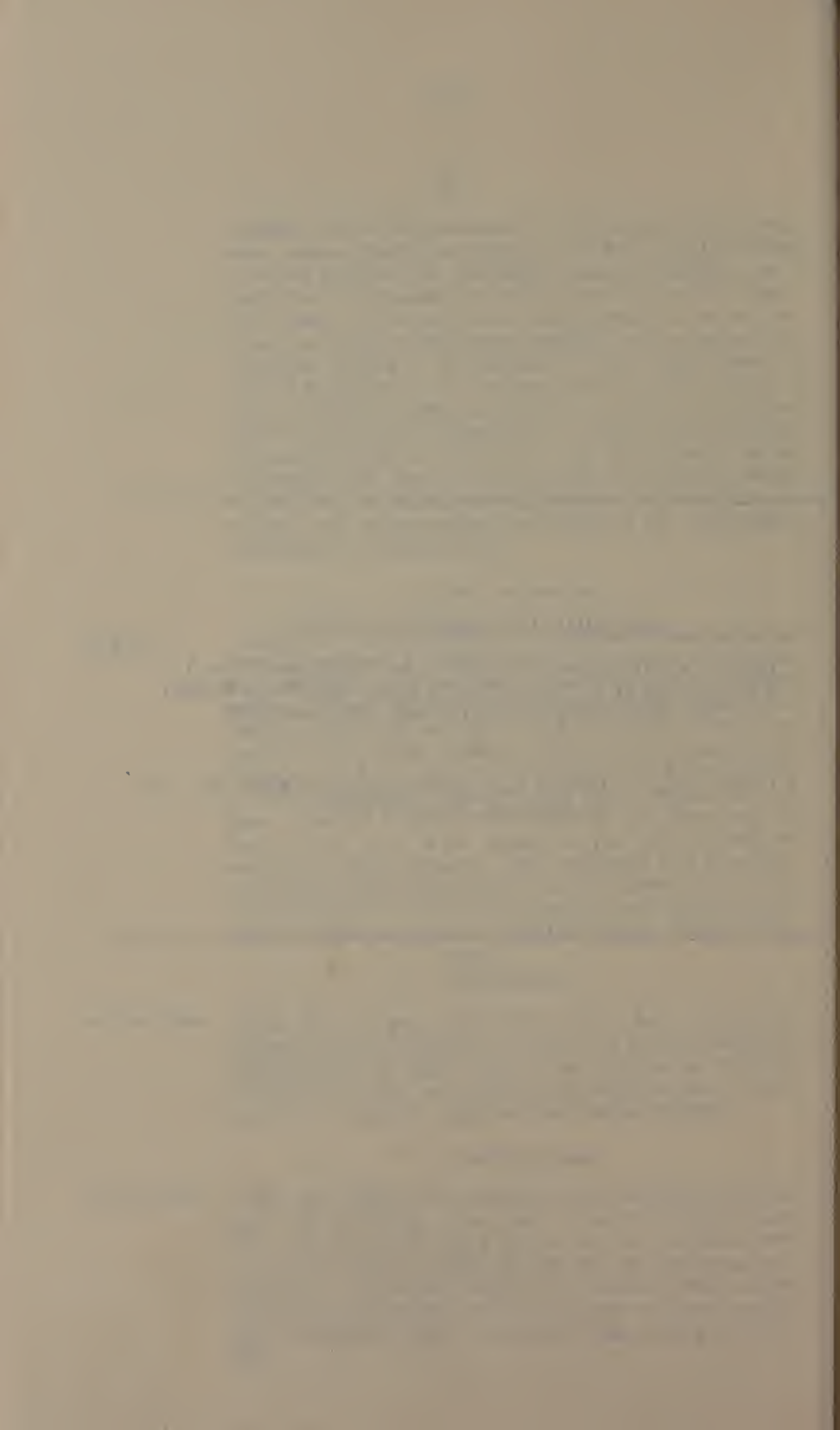
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SECTION-BY-SECTION INDEX

WITH A COMPARISON OF SECTIONS OF THE CLEAN AIR ACT  
AMENDMENTS (P.L. 95-95), S. 252, H.R. 6161, HOUSE REPORT  
No. 94-1742 (1976), AND PRIOR EXISTING LAW

AND

A COMPARISON OF PUBLIC LAW 95-95 AND THE CLEAN AIR ACT  
AS AMENDED AUGUST, 1977



## NOTES ON THE USE OF THE INDEX

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The index is preceded by a comparison of sections of the Clean Air Act Amendments of 1977 (Public Law 95-95), S. 252, H.R. 6161, House Report No. 94-1742 (1976),<sup>1</sup> and prior existing law, and a comparison of Public Law 95-95 and the Clean Air Act as amended August, 1977. The index follows the same order of sections as the comparisons.

Each section of the law is indexed separately, although the order of the documentation is the same throughout. Bold figures in the index denote particularly significant references. Provisions without a direct counterpart in the 1977 statute are referenced under the section containing the closest version.

This arrangement provides a chronology of the development of each provision, an indication of its origin and important legislative milestones in summary form, and an easily accessible record of the standing of each provision within the statute as a whole. Pagination is consecutive throughout volumes 3-8.

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<sup>1</sup> House Report No. 94-1742 is the conference report accompanying S. 3219. Conference proceedings took place in the 94th Congress but S. 3219 did not come to a vote in the Senate prior to adjournment.

THE HISTORY OF THE

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CHARLES THE FIRST  
IN WHICH ARE CONTAINED  
THE MOST IMPORTANT AND INTERESTING  
PARTS OF HIS REIGN  
FROM HIS CORONATION  
UNTIL HIS DEATH  
BY  
JOHN BURNET  
ESQ;  
OF LINCOLN'S INN  
IN TWO VOLUMES  
THE SECOND VOLUME  
LONDON  
Printed by J. Sturges, at the Angel in St. Dunstons Church-yard, 1724.



## COMPARISON OF SECTIONS OF PUBLIC LAW 95-95 AND THE CLEAN AIR ACT AS AMENDED AUGUST 1977

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COMPARISON OF SECTIONS OF THE CLEAN AIR ACT AS AMENDED AUGUST 1977, PUBLIC LAW 95-95, S. 252, H.R.  
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TITLE I: AIR POLLUTION PREVENTION AND CONTROL

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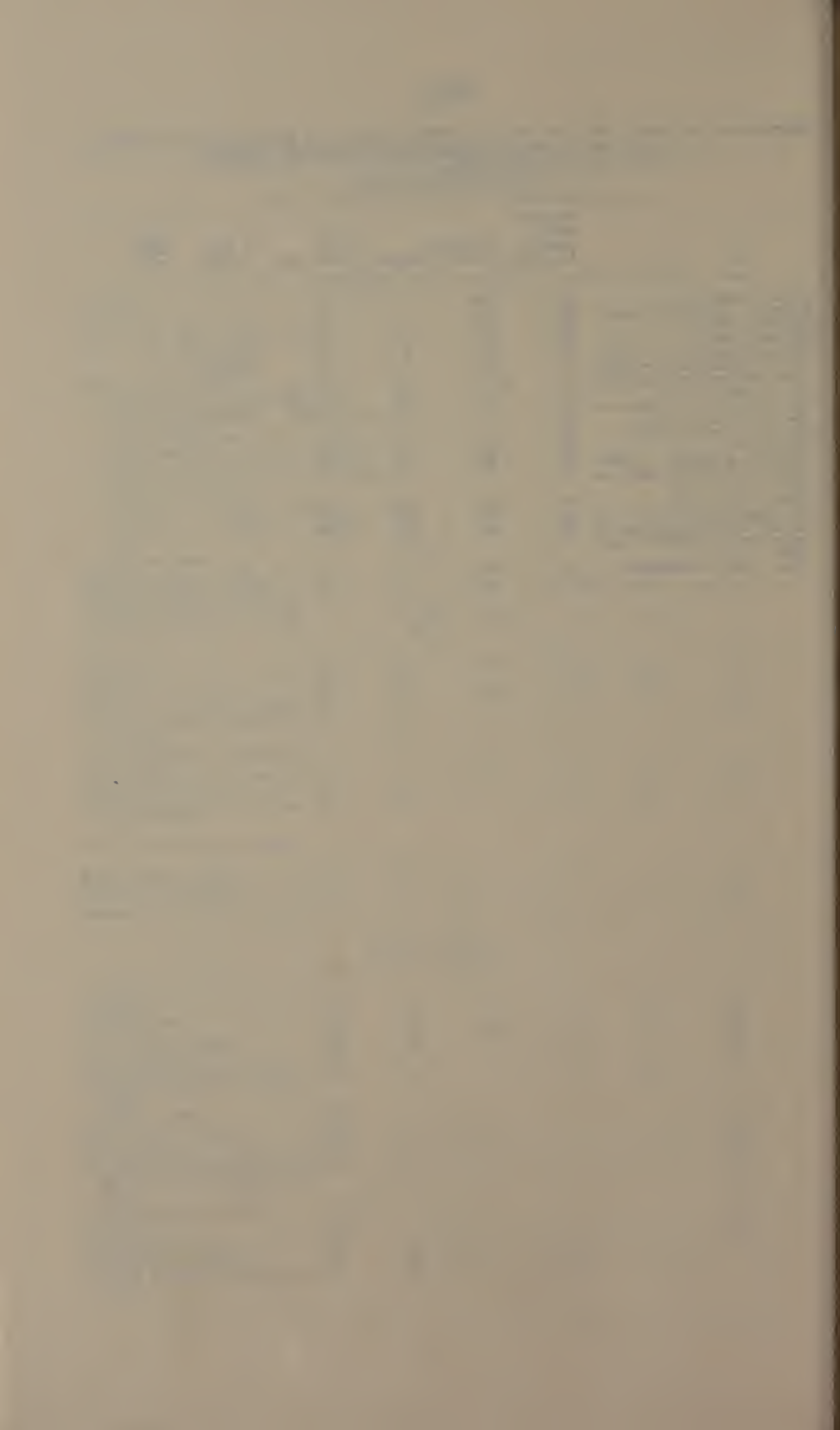
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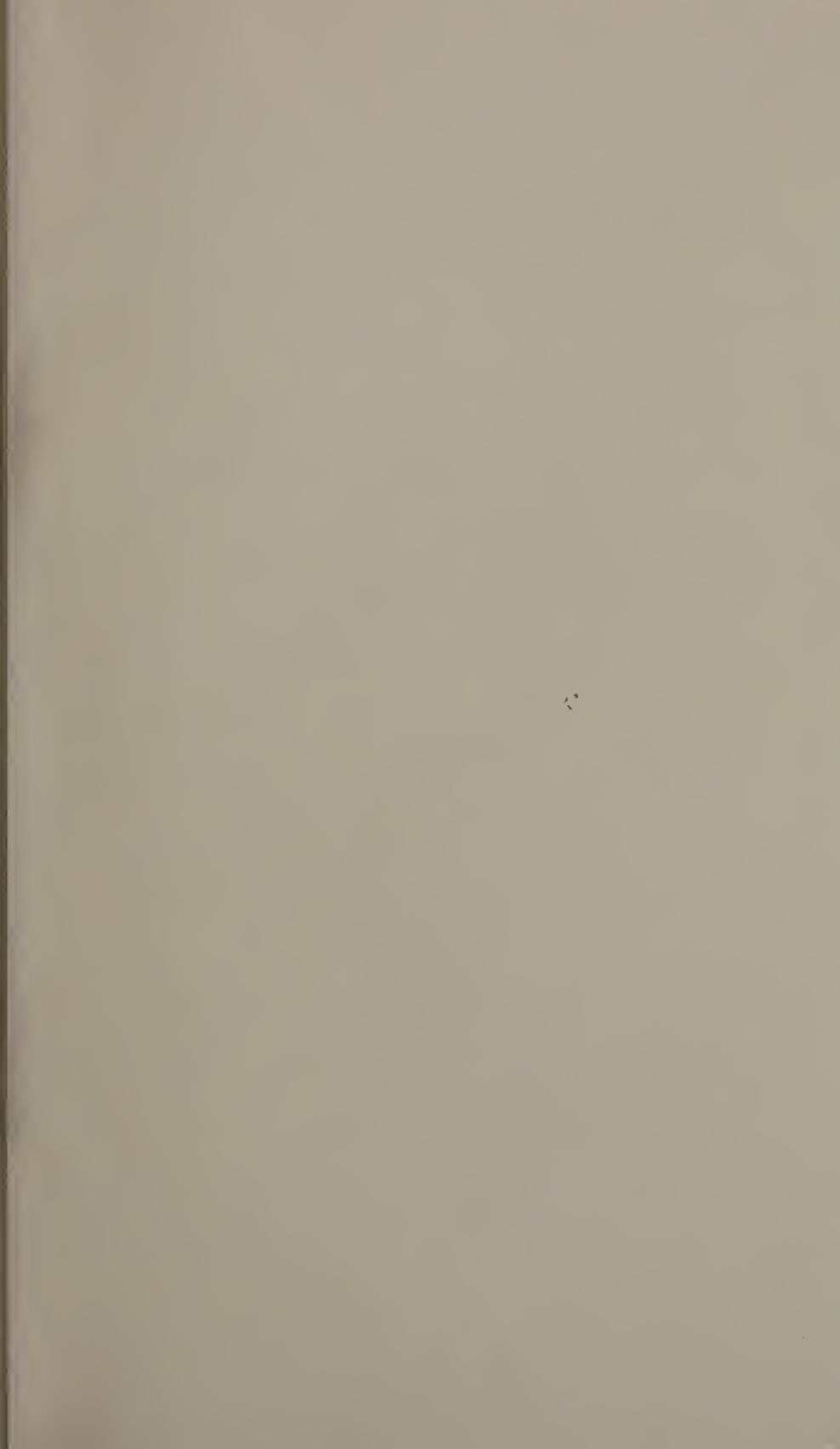
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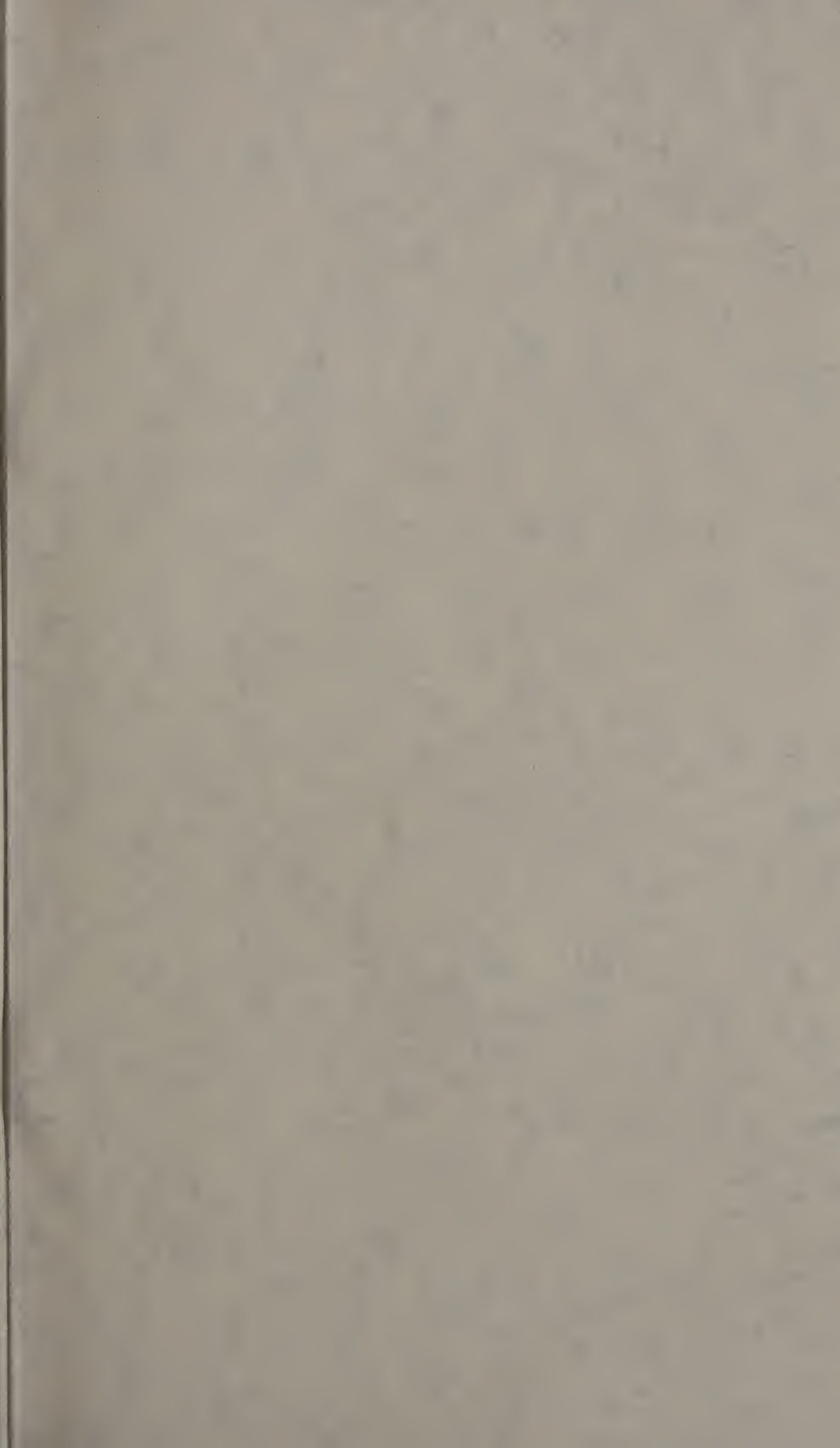
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